Analyzing several equations concerning the Black Hole and Wormhole entropies, Mock theta functions and the Partition numbers. New possible mathematical connections with various sectors of Number Theory and String Theory II.

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Abstract

In this research thesis, (part II) we analyze several equations concerning the Black Hole and Wormhole entropies, Mock theta functions and the Partition numbers. New possible mathematical connections with various sectors of Number Theory and String Theory

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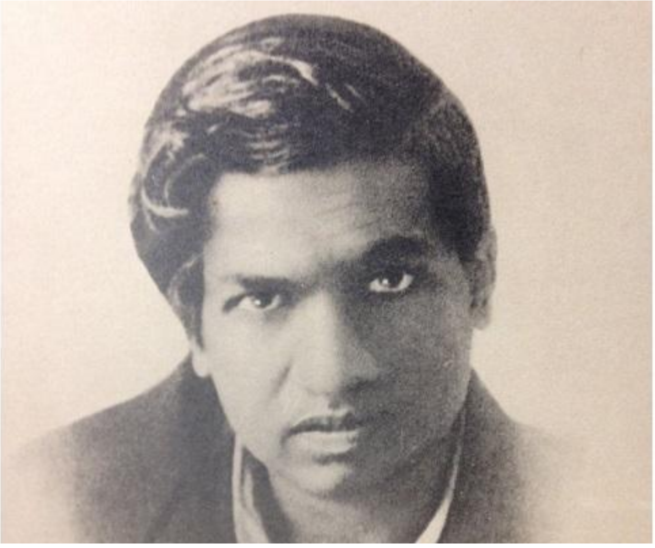
Srinivasa Ramanujan (1887-1920)



https://www.moduscc.it/ramanujan-il-grande-matematico-indiano-13453-131115/

Vesuvius landscape with gorse – Naples

https://www.pinterest.it/pin/95068242114589901/

From:

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For:

SMBH87 mass = M = 13.12806e+39 ; charge = Q = 1.12496e+15 ;

r = 1.94973e+13 ; k_{RN} = 1

The entropy of the horizons is obtained:

$$S_{\pm} = k_{\mathrm{RN}} 4\pi r^2 \pm \sqrt{\frac{6M^2 r_{\pm}^2 - 12 M r_{\pm} Q^2 + 6Q^4}{6M^2 r_{\pm}^2 - 12 M r_{\pm} Q^2 + 7Q^4}}.$$

4Pi*(1.94973e+13)^2+

(6*(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/(6*(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+7(1.12496e+15)^4)

Input interpretation

$$(6(13.12806\times10^{39})^2(1.94973\times10^{13})^2 - 12\times13.12806\times10^{39}\times1.94973\times10^{13}(1.12496\times10^{15})^2 + 6(1.12496\times10^{15})^4)/(6(13.12806\times10^{39})^2(1.94973\times10^{13})^2 - 12\times13.12806\times10^{39}\times1.94973\times10^{13}(1.12496\times10^{15})^2 + 7(1.12496\times10^{15})^4)$$

Result

0.99999999999999999999999999999999999999999999999592575615730553 09
...

0.99999….

4Pi*(1.94973e+13)^2+sqrt(0.9999999999999999999999999999999999999999999999
99592575615730553 09)

Input interpretation

$$4\pi\left(1.94973\times 10^{13}\right)^2+\sqrt{0.99999999999999999999999999999999999999999999999959257561573055309}$$

Result

$4.777039278893225273468010955145767616679374911887978844909 18\ldots\times 10^{27}$

4.777039278893*10^{27} = entropy of the horizons

Or, for M = 1:

4Pi*(1.94973e+13)^2+(6*(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/ (6*(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+7(1.12496e+15)^4)

Input interpretation

$$4\pi\left(1.94973\times 10^{13}\right)^2+\frac{6\left(1.94973\times 10^{13}\right)^2-12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2+6\left(1.12496\times 10^{15}\right)^4}{6\left(1.94973\times 10^{13}\right)^2-12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2+7\left(1.12496\times 10^{15}\right)^4}$$

Result

$4.777039278893225273468010955002910473822232050972133224013 06\ldots\times 10^{27}$

4.7770392788…*10^27 = entropy of the horizons (similar to the previous one)

From:

$$s_{\mathrm{RN1}} = 2r\sqrt{\frac{6r^2 - 12rQ^2 + 6Q^4}{6r^2 - 12rQ^2 + 7Q^4}},$$

2*(1.94973e+13)*sqrt(((6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+6(1.12496e+15)^4 / 6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+7(1.12496e+15)^4)))

sqrt(((((6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+6(1.12496e+15)^4)) / ((6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+7(1.12496e+15)^4)))))

Input interpretation

$$\sqrt{\frac{6\left(1.94973\times 10^{13}\right)^2 - 12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 6\left(1.12496\times 10^{15}\right)^4}{6\left(1.94973\times 10^{13}\right)^2 - 12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 7\left(1.12496\times 10^{15}\right)^4}}$$

Result

0.925820099772551459528920111229739374258698272110578925481187899 2…

0.92582009977….

2*(1.94973e+13)*sqrt(((((6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+6(1.12496e+15)^4)) / ((6*(1.94973e+13)^2-12*1.94973e+13*(1.12496e+15)^2+7(1.12496e+15)^4)))))

Input interpretation

$$2\times 1.94973\times 10^{13}\sqrt{\left(\left(6\left(1.94973\times 10^{13}\right)^2 - 12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 6\left(1.12496\times 10^{15}\right)^4\right)/\left(6\left(1.94973\times 10^{13}\right)^2 - 12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 7\left(1.12496\times 10^{15}\right)^4\right)\right)}$$

Result

$3.6101984462590735143746428169359195003468235641643180967568 7\ldots \times 10^{13}$

3.610198446259*10^13

and from:

$$s_{RN2} = \frac{1}{2} r^2 \left[\frac{\sqrt{6} Q^4 M}{(6r^2 - 12r Q^2 + 7Q^4)^{\frac{3}{2}}} \right].$$

1/2*(1.94973e+13)^2 [((sqrt6 *(1.12496e+15)^4*(13.12806e+39))) / ((((6(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+7((1.12496e+15)^4)))))^1.5]

Input interpretation

$$\frac{1}{2} (1.94973 \times 10^{13})^2 \times \left(\sqrt{6} \, (1.12496 \times 10^{15})^4 \times 13.12806 \times 10^{39}\right) \Big/ \left(6 \, (1.94973 \times 10^{13})^2 - 12 \times 1.94973 \times 10^{13} \, (1.12496 \times 10^{15})^2 + 7 \, (1.12496 \times 10^{15})^4\right)^{1.5}$$

Result

$2.6077977692594370749065352472966206661053162846996508411425 4\ldots \times 10^{35}$

2.607797769259*10^35

Or, for M = 1:

1/2*(1.94973e+13)^2 [((sqrt6 *(1.12496e+15)^4)) / ((((6(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+7((1.12496e+15)^4)))))^1.5]

Input interpretation

$$\frac{1}{2}\left(1.94973\times 10^{13}\right)^2\times \left(\sqrt{6}\left(1.12496\times 10^{15}\right)^4\right)/\left(6\left(1.94973\times 10^{13}\right)^2-12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2+7\left(1.12496\times 10^{15}\right)^4\right)^{1.5}$$

Result

0.0000198643…

0.0000198643

The entropy density is given by:

$$\mathfrak{s}=k_{RN}\left|\frac{1}{r^2}\sqrt{\left(1-\frac{R_s}{r}+\frac{Q^2}{r^2}\right)}\frac{\partial}{\partial r}(r^2 P)\right|=k_{RN}\left|\frac{1}{r^2}\sqrt{\left(1-\frac{R_s}{r}+\frac{Q^2}{r^2}\right)}\times(s_{\mathrm{RN1}}+s_{\mathrm{RN2}})\right|, \tag{28}$$

Thence, from:

$$k_{RN}\left|\frac{1}{r^2}\sqrt{\left(1-\frac{R_s}{r}+\frac{Q^2}{r^2}\right)}\times(s_{\mathrm{RN1}}+s_{\mathrm{RN2}})\right|,$$

we obtain:

1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259*10^13+2.607797769259*10^35)

Input interpretation

$$\frac{1}{\left(1.94973\times 10^{13}\right)^2}\sqrt{1-1+\frac{\left(1.12496\times 10^{15}\right)^2}{\left(1.94973\times 10^{13}\right)^2}}\left(3.610198446259\times 10^{13}+2.607797769259\times 10^{35}\right)$$

Result

$3.958107340541986166117583265883126837465534567866623244210 80\ldots \times 10^{10}$

3.9581073405419*10^{10} = entropy density

Or, for M = 1:

1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(0.0000198643+2.607797769259*10^35)

Input interpretation

$$\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\,(0.0000198643+2.607797769259\times 10^{35})$$

Result

$3.958107340541986166117035311086194429394134298443283795742 23\ldots \times 10^{10}$

3.95810734..*10^{10} result similar to the previous one

Dividing the values of the two entropies:

4.777039278893e+27 * 1/((((1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259e+13+2.607797769259e+35)))))

Input interpretation

$$4.777039278893\times 10^{27}\times 1\Bigg/\left(\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\right.$$
$$\left.(3.610198446259\times 10^{13}+2.607797769259\times 10^{35})\right)$$

Result

$1.206899881153520450136614173835890395976339898682134466624402\ldots\times 10^{17}$

1.2068998811…*10^{17}

Or, for M = 1:

1/3.95810734054198616611 7× 10^10 * 4Pi*(1.94973e+13)^2+(6*(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/ (6*(1.94973e+13)^2-12(1.94973e+13)(1.12496e+15)^2+7(1.12496e+15)^4)

Input interpretation

$$\frac{1}{3.958107340541986166117\times 10^{10}}\times 4\left(\pi\left(1.94973\times 10^{13}\right)^2\right)+\frac{6\left(1.94973\times 10^{13}\right)^2-12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2+6\left(1.12496\times 10^{15}\right)^4}{6\left(1.94973\times 10^{13}\right)^2-12\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2+7\left(1.12496\times 10^{15}\right)^4}$$

Result

$1.206899881153577373149550552081758660201749544415630166527 59\ldots\times 10^{17}$

1.20689988115357…*10^{17} result similar to the previous one

Now, we consider the following partition number:

p(337) = 117949491546113972 = 1.17949491546113972 * 10^{17}

From the Hardy-Ramanujan partition formula

$$p(n) \sim \frac{1}{4n\sqrt{3}} \cdot e^{\pi\sqrt{2n/3}}.$$

we obtain for n = 337

1/((4*337)sqrt3)*(exp(Pi*sqrt((2*337)/3)))

Input

$$\frac{1}{(4 \times 337)\sqrt{3}} \exp\left(\pi \sqrt{\frac{2 \times 337}{3}}\right)$$

Exact result

$$\frac{e^{\sqrt{674/3}\,\pi}}{1348\sqrt{3}}$$

Decimal approximation

$1.208452075454001533353116538783506892841372901257689537602 24\ldots \times 10^{17}$

$1.208452075454\ldots.*10^{17}$

Property

$\frac{e^{\sqrt{674/3}\,\pi}}{1348\sqrt{3}}$ is a transcendental number

Series representations

$$\frac{\exp\left(\pi\sqrt{\frac{2\times337}{3}}\right)}{(4\times337)\sqrt{3}} = \frac{\exp\left(\pi\sqrt{\frac{671}{3}}\sum_{k=0}^{\infty}\left(\frac{671}{3}\right)^{-k}\binom{\frac{1}{2}}{k}\right)}{1348\sqrt{2}\sum_{k=0}^{\infty}2^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{\exp\left(\pi\sqrt{\frac{2\times337}{3}}\right)}{(4\times337)\sqrt{3}} = \frac{\exp\left(\pi\sqrt{\frac{671}{3}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{671}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}\right)}{1348\sqrt{2}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{2}\right)^{k}\left(-\frac{1}{2}\right)_{k}}{k!}}$$

$$\frac{\exp\left(\pi\sqrt{\frac{2\times337}{3}}\right)}{(4\times337)\sqrt{3}} = \frac{\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}\left(\frac{674}{3}-z_0\right)^{k}z_0^{-k}}{k!}\right)}{1348\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^{k}\left(-\frac{1}{2}\right)_{k}(3-z_0)^{k}z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Multiplying the Hardy-Ramanujan formula by 0.976037808547:

0.976037808547(((1/((4*337)sqrt3)*(exp(Pi*sqrt((2*337)/3))))))

Input interpretation

$$0.976037808547\left(\frac{1}{(4\times337)\sqrt{3}}\exp\left(\pi\sqrt{\frac{2\times337}{3}}\right)\right)$$

Result

$1.17949491546\ldots \times 10^{17}$

1.17949491546…*10^17

p(337) =

$= 1.17949491546113972 \times 10^{17}$

Series representations

$$\frac{0.9760378085470000 \exp\left(\pi \sqrt{\frac{2\times 337}{3}}\right)}{(4\times 337)\sqrt{3}} = \frac{0.0007240636561921365 \exp\left(\pi \sqrt{\frac{671}{3}} \sum_{k=0}^{\infty} \left(\frac{671}{3}\right)^{-k} \binom{\frac{1}{2}}{k}\right)}{\sqrt{2} \sum_{k=0}^{\infty} 2^{-k} \binom{\frac{1}{2}}{k}}$$

$$\frac{0.9760378085470000 \exp\left(\pi \sqrt{\frac{2\times 337}{3}}\right)}{(4\times 337)\sqrt{3}} = \frac{0.0007240636561921365 \exp\left(\pi \sqrt{\frac{671}{3}} \sum_{k=0}^{\infty} \frac{\left(-\frac{3}{671}\right)^k \left(-\frac{1}{2}\right)_k}{k!}\right)}{\sqrt{2} \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{2}\right)^k \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{0.9760378085470000 \exp\left(\pi \sqrt{\frac{2\times 337}{3}}\right)}{(4\times 337)\sqrt{3}} = \frac{0.0007240636561921365 \exp\left(\pi \sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(\frac{674}{3} - z_0\right)^k z_0^{-k}}{k!}\right)}{\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k (3 - z_0)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From the previous expression:

$$4.777039278893\times 10^{27}\times 1\Bigg/\left(\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\,(3.610198446259\times 10^{13}+2.607797769259\times 10^{35})\right)$$

Multiplying by 0.977293091067182932 , we obtain:

0.977293091067182932(((4.777039278893e+27 * 1/((((1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259e+13+2.607797769259e+35))))))))

Input interpretation

$$0.977293091067182932\left(4.777039278893\times 10^{27}\times 1\Bigg/\left(\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\,(3.610198446259\times 10^{13}+2.607797769259\times 10^{35})\right)\right)$$

Result

$1.179494915461139718892068084184626192571983986082021536015\,30\ldots\times 10^{17}$

$1.1794949154611\ldots*10^{17}$

p(337) =

$= 1.17949491546113972\times 10^{17}$

We note that 0.976037808547 and 0.977293091067182932 are value that are in the range of the following Regge slope meson

$\omega/\omega_3 \mid 5+3 \mid m_{u/d} = 240-345 \mid 0.937-1.000$

In his last letter to Hardy, Srinivasa Ramanujan states:

I have proved that if

$$f(q) = 1 + \frac{q}{(1+q)^2} + \frac{q^4}{(1+q)^2(1+q^2)^2} + \dots$$

then

$$f(q) + (1-q)(1-q^3)(1-q^5)\dots(1-2q+2q^4-2q^9+\dots) = O(1)$$

at all the points $q=-1, q^3=-1, q^5=-1, q^7=-1, \dots$, and at the same time

$$f(q) - (1-q)(1-q^3)(1-q^5)\dots(1-2q+2q^4-\dots) = O(1)$$

at all the points $q^2=-1, q^4=-1, q^6=-1, \dots$ Also obviously $f(q)=O(1)$ at all the points $q=1, q^3=1, q^5=1, \dots$ And so $f(q)$ is a Mock ϑ function. When $q=-e^{-t}$ and $t \to 0$

$$f(q) + \sqrt{\frac{\pi}{t}} \exp\left(\frac{\pi^2}{24t} - \frac{t}{24}\right) \to 4.$$

The coefficient of q^n in $f(q)$ is

$$(-1)^{n-1}\frac{\exp\left(\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{2\sqrt{n-\frac{1}{24}}}+O\left(\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{n-\frac{1}{24}}}\right) \tag{1}$$

From this expression,

$$(-1)^{n-1}\frac{\exp\left(\pi\sqrt{\frac{n}{6}-\frac{1}{144}}\right)}{2\sqrt{n-\frac{1}{24}}}+O\left(\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{n-\frac{1}{24}}}\right)$$

for n = 337, we obtain:

(-1)^336 * (((exp(Pi*sqrt(337/6-1/144))/(2(sqrt(337-1/24)))+(exp(Pi/2*sqrt(Pi/6-1/144)))/(sqrt(337-1/24)))))

Input

$$(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)$$

Exact result

$$\sqrt{\frac{6}{8087}}\, e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}$$

Decimal approximation

4.5686694344429251479645365440236764571320266909819533372051 2... × 10^8

4.5686694…*10^8

Alternate forms

$$\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\, e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)$$

$$\sqrt{\frac{6}{8087}}\, e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\sqrt{\frac{6}{8087}}\, e^{1/24\,\pi\sqrt{24\,\pi-1}}$$

Series representations

$$(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.$$
$$\left.2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/$$
$$\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right) \text{ for (not } (z_0\in\mathbb{R} \text{ and } -\infty<z_0\le 0))$$

$$(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.$$
$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/$$
$$\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)$$

for $(x\in\mathbb{R}$ and $x<0)$

$$(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{8087}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{8087}{144}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.$$

$$\left.\left.2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\right.$$

$$\left.\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{8087}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{8087}{24}-z_0\right)/(2\pi)\right\rfloor}\right)\Big/$$

$$\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right)$$

Furthermore, from:

$$f(q)+\sqrt{\frac{\pi}{t}}\exp\left(\frac{\pi^2}{24t}-\frac{t}{24}\right)\to 4.$$

We have:

$f(q) = 4-\left[\sqrt{\frac{\pi}{t}}\ exp\left(\frac{\pi^2}{24t}-\frac{t}{24}\right)\right]$, for t = 1/64 :

4-[√(64π) * exp(π^2*1/(24(1/64))-(1/64)*1/24)]

Input

$$4-\sqrt{64\,\pi}\,\exp\left(\pi^2\times\frac{1}{24\times\frac{1}{64}}-\frac{1}{64}\times\frac{1}{24}\right)$$

Exact result

$$4 - 8\, e^{(8\pi^2)/3 - 1/1536} \sqrt{\pi}$$

Decimal approximation

$-3.8155292986973019194150965274556215734980328507213593666602\ldots \times 10^{12}$

-3.81552929…*10^12

Alternate forms

$$-4\left(2\, e^{(8\pi^2)/3 - 1/1536} \sqrt{\pi} - 1\right)$$

$$\frac{4\left(\sqrt[1536]{e} - 2\, e^{(8\pi^2)/3} \sqrt{\pi}\right)}{\sqrt[1536]{e}}$$

Series representations

$$4 - \sqrt{64\pi}\, \exp\left(\frac{\pi^2}{\frac{24}{64}} - \frac{1}{64 \times 24}\right) = 4 - \exp\left(-\frac{1}{1536} + \frac{8\pi^2}{3}\right) \sqrt{-1 + 64\pi} \sum_{k=0}^{\infty} (-1 + 64\pi)^{-k} \binom{\frac{1}{2}}{k}$$

$$4 - \sqrt{64\pi}\, \exp\left(\frac{\pi^2}{\frac{24}{64}} - \frac{1}{64 \times 24}\right) = 4 - \exp\left(-\frac{1}{1536} + \frac{8\pi^2}{3}\right) \sqrt{-1 + 64\pi} \sum_{k=0}^{\infty} \frac{(-1)^k (-1 + 64\pi)^{-k} \left(-\frac{1}{2}\right)_k}{k!}$$

$$4-\sqrt{64\pi}\,\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)=$$

$$4-\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k (64\pi-z_0)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From the algebraic sum between the two expressions, we obtain:

((-1)^336 * (((exp((((Pi*sqrt(337/6-1/144))/(2(sqrt(337-1/24))))+(((exp(Pi/2*sqrt(Pi/6-1/144)))/(sqrt(337-1/24)))))))-((4-[√(64π) * exp(π^2*1/(24(1/64))-(1/64)*1/24)])))))

Input

$$(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\,\exp\left(\pi^2\times\frac{1}{24\times\frac{1}{64}}-\frac{1}{64}\times\frac{1}{24}\right)\right)\right)$$

Exact result

$$-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}$$

Decimal approximation

3.8155292986995492864270139929951578906055937694798786247294 4... × 10^{12}

3.81552929…*10^{12}

Alternate form

$$\frac{-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\, e^{1/24\pi\sqrt{24\pi-1}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}}{\sqrt[1536]{e}}$$

Series representations

$$(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\,\pi}\ \exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=$$

$$-4+\exp\left(\left(2\exp\left(\frac{1}{2}\,\pi\,\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+\pi\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(2\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)+\exp\left(-\frac{1}{1536}+\frac{8\,\pi^2}{3}\right)\sqrt{z_0}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(64\,\pi-z_0)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

$$(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\ \exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=$$

$$-4+\exp\left(\left(2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.$$

$$\left.\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/$$

$$\left.\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)+$$

$$\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\exp\left(i\pi\left\lfloor\frac{\arg(64\pi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(64\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\ \pi\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\ \exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=$$

$$-4+\exp\left(\frac{\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}{\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\right.$$

$$\left.\frac{\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)+$$

$$\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\exp\left(i\pi\left\lfloor\frac{\arg(64\pi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\ \sum_{k=0}^{\infty}\frac{(-1)^k(64\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

From which, we obtain, after some calculations:

((4096 ×7)+2048+128 +64) (((((-1)^336 (((exp((((Pi*sqrt(337/6-1/144))/(2(sqrt(337-1/24))))+(((exp(Pi/2*sqrt(Pi/6-1/144)))/(sqrt(337-1/24)))))))-((4-[√(64π) exp(π^2*1/(24(1/64))-(1/64)*1/24)]))))))))

Input

$$(4096\times 7+2048+128+64)\left((-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\ \exp\left(\pi^2\times\frac{1}{24\times\frac{1}{64}}-\frac{1}{64}\times\frac{1}{24}\right)\right)\right)\right)$$

Exact result

$$30912\left(-4+e^{2\sqrt{\frac{6}{8087}}\ e^{1/2\sqrt{\pi/6-1/144}\ \pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)$$

Decimal approximation

1.1794564168140046754203185655146632071440011460216200804763 6... × 10^{17}

1.17945641…*10^{17} = p(337) =

= 1.17949491546113972 × 10^{17}

Alternate forms

$$-123648+30912\,e^{2\sqrt{\frac{6}{8087}}\ e^{1/24\pi\sqrt{24\pi-1}}+\frac{\pi}{2\sqrt{6}}}+247296\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}$$

$$\frac{30912\left(-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\ e^{1/24\pi\sqrt{24\pi-1}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}\right)}{\sqrt[1536]{e}}$$

Expanded form

$$-123648+30912\,e^{2\sqrt{\frac{6}{8087}}\ e^{1/2\sqrt{\pi/6-1/144}\ \pi}+\frac{\pi}{2\sqrt{6}}}+247296\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}$$

Series representations

$$(4096\times 7+2048+128+64)(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=$$

$$30912\left(-4+\exp\left(\left(2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)+\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)\bigg/\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)+\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(64\pi-z_0)^k z_0^{-k}}{k!}\right)$$

for (not ($z_0\in\mathbb{R}$ and $-\infty<z_0\le 0$))

$$(4096\times 7+2048+128+64)(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\pi}\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=$$

$$30\,912\left(-4+\exp\left(\left(2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)+\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\exp\left(i\pi\left\lfloor\frac{\arg(64\pi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(64\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad \text{for } (x\in\mathbb{R} \text{ and } x<0)$$

$$(4096\times 7+2048+128+64)\,(-1)^{336}\left(\exp\left(\frac{\pi\sqrt{\frac{337}{6}-\frac{1}{144}}}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\,\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)-\left(4-\sqrt{64\,\pi}\,\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)\right)=30\,912\left(-4+\exp\left(\frac{\exp\left(\frac{1}{2}\,\pi\exp\left(i\,\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)}{\exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}+\frac{\pi\exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}{2\exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}}\right)+\exp\left(-\frac{1}{1536}+\frac{8\,\pi^2}{3}\right)\exp\left(i\,\pi\left\lfloor\frac{\arg(64\,\pi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\,\sum_{k=0}^{\infty}\frac{(-1)^k\,(64\,\pi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

Or also:

((e^(1/e + e - 4/π - 11 π) π^(17 e - 8) cos(e π) cot(e π))) ((-4 + e^(2 sqrt(6/8087) e^(1/2 sqrt(π/6 - 1/144) π) + π/(2 sqrt(6))) + 8 e^((8 π^2)/3 - 1/1536) sqrt(π)))

where

$$e^{1/e+e-4/\pi-11\,\pi}\,\pi^{17\,e-8}\cos(e\,\pi)\cot(e\,\pi)\approx 30913.0089988630723$$

Input

$$\left(e^{1/e+e-4/\pi-11\pi}\,\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)\left(-4+\exp\left(2\sqrt{\frac{6}{8087}}\;e^{1/2\sqrt{\pi/6-1/144}\;\pi}+\frac{\pi}{2\sqrt{6}}\right)+8\,e^{1/3\,(8\pi^2)-1/1536}\sqrt{\pi}\right)$$

$\cot(x)$ is the cotangent function

Exact result

$$e^{1/e+e-4/\pi-11\pi}\left(-4+e^{2\sqrt{\frac{6}{8087}}\;e^{1/2\sqrt{\pi/6-1/144}\;\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)$$

Decimal approximation

1.1794949154612487463625424312258523338754162878718288610443 6... × 10^{17}

1.179494915…*10^{17}

p(337) =

= 1.17949491546113972 × 10^{17}

Alternate forms

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\;e^{1/24\,\pi\sqrt{24\pi-1}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\,e^{-4/\pi-11\pi+2\cosh(1)}$$

$$e^{-1/1536+1/e+e-4/\pi-11\pi}\left(-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\;e^{1/24\,\pi\sqrt{24\pi-1}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}\right)\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)$$

$$\frac{1}{\sin(e\,\pi)} e^{1/e+e-4/\pi-11\,\pi} \left(-4 + e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{-1/144+\pi/6}\,\pi} + \frac{\pi}{2\sqrt{6}}} + 8\, e^{-1/1536+(8\,\pi^2)/3}\sqrt{\pi}\right) \pi^{-8+17\,e} \cos^2(e\,\pi)$$

$\cosh(x)$ is the hyperbolic cosine function

Expanded form

$$\pi^{17\,e-8} \exp\left(\frac{1}{e} + e + 2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi} - \frac{4}{\pi} - 11\,\pi + \frac{\pi}{2\sqrt{6}}\right) \cos(e\,\pi)\cot(e\,\pi) - 4\, e^{1/e+e-4/\pi-11\,\pi}\,\pi^{17\,e-8}\cos(e\,\pi)\cot(e\,\pi) + 8\, e^{-1/1536+1/e+e-4/\pi-11\,\pi+(8\,\pi^2)/3}\,\pi^{17\,e-15/2}\cos(e\,\pi)\cot(e\,\pi)$$

Alternative representations

$$\left(-4 + e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi} + \frac{\pi}{2\sqrt{6}}} + 8\, e^{(8\,\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\,\pi} \left(\pi^{17\,e-8}\cos(e\,\pi)\cot(e\,\pi)\right) = -i\left(\cosh(-i\,e\,\pi)\coth(-i\,e\,\pi)\, e^{e-11\,\pi+1/e-4/\pi}\, \pi^{-8+17\,e}\left(-4 + e^{\frac{\pi}{2\sqrt{6}}+2\,e^{1/2\,\pi\sqrt{\pi/6-1/144}}\sqrt{\frac{6}{8087}}} + 8\, e^{-1/1536+(8\,\pi^2)/3}\sqrt{\pi}\right)\right)$$

$$\left(-4 + e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi} + \frac{\pi}{2\sqrt{6}}} + 8\, e^{(8\,\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\,\pi} \left(\pi^{17\,e-8}\cos(e\,\pi)\cot(e\,\pi)\right) = \cosh(e\,i\,\pi)\, e^{e-11\,\pi+1/e-4/\pi}\, \pi^{-8+17\,e}\left(i + \frac{2\,i}{-1+e^{2\,e\,i\,\pi}}\right) \left(-4 + e^{\frac{\pi}{2\sqrt{6}}+2\,e^{1/2\,\pi\sqrt{\pi/6-1/144}}\sqrt{\frac{6}{8087}}} + 8\, e^{-1/1536+(8\,\pi^2)/3}\sqrt{\pi}\right)$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)e^{1/e+e-4/\pi-11\pi}$$
$$\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=\cosh(-i\,e\,\pi)\,e^{e-11\pi+1/e-4/\pi}\,\pi^{-8+17e}$$
$$\left(i+\frac{2\,i}{-1+e^{2\,e\,i\,\pi}}\right)\left(-4+e^{\frac{\pi}{2\sqrt{6}}+2\,e^{1/2\pi\sqrt{\pi/6-1/144}}\sqrt{\frac{6}{8087}}}+8\,e^{-1/1536+(8\pi^2)/3}\sqrt{\pi}\right)$$

Series representations

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)$$
$$e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=$$
$$e^{1/e+e-4/\pi-11\pi}\left(-4\,e+e^{1+2\sqrt{\frac{6}{8087}}\,e^{1/24\pi\sqrt{-1+24\pi}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{1535/1536+(8\pi^2)/3}\sqrt{\pi}\right)$$
$$\pi^{-7+17e}\sum_{k_1=-\infty}^{\infty}\sum_{k_2=0}^{\infty}\frac{(-1)^{k_2}\,(e\,\pi)^{2k_2}}{(2\,k_2)!\left(e^2\,\pi^2-\pi^2\,k_1^2\right)}$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)$$
$$e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=-i\,e^{-1/1536+1/e+e-4/\pi-11\pi}$$
$$\left(-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\,e^{1/24\pi\sqrt{-1+24\pi}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}\right)$$
$$\pi^{-8+17e}\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\,(e\,\pi)^{2k}}{(2\,k)!}\quad\text{for } q=e^{i\,e\,\pi}$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=i\,e^{-1/1536+1/e+e-4/\pi-11\pi}\left(-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\,e^{1/24\pi\sqrt{-1+24\pi}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}\right)\pi^{-8+17e}\left(1+2\sum_{k=1}^{\infty}q^{2k}\right)\sum_{k=0}^{\infty}\frac{(-1)^k\left(\left(-\frac{1}{2}+e\right)\pi\right)^{1+2k}}{(1+2k)!}\quad \text{for } q=e^{i\,e\,\pi}$$

Integral representations

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=\int_0^1\int_0^1\cos\left(\frac{1}{2}(1-2e)\pi\,t_2\right)\sec^2\left(\frac{1}{2}(1-2e)\pi\,t_1\right)dt_2\,dt_1$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=e^{-1/1536+1/e+e-4/\pi-11\pi}\left(-4\sqrt[1536]{e}+e^{\frac{1}{1536}+2\sqrt{\frac{6}{8087}}\,e^{1/24\pi\sqrt{-1+24\pi}}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3}\sqrt{\pi}\right)\pi^{-8+17e}\left(\int_{\frac{\pi}{2}}^{e\pi}\csc^2(t)\,dt\right)\left(-1+e\,\pi\int_0^1\sin(e\,\pi\,t)\,dt\right)$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right)$$

$$e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=$$

$$\int_{\frac{\pi}{2}}^{e\pi}\left(4\,i\,e^{-1/1536+1/e+e-4/\pi-11\pi+(8\pi^2)/3}\,\pi^{-8+17e}\csc^2(t)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-(e^2\pi^2)/(4s)+s}}{\sqrt{s}}\,ds-\right.$$

$$2\,i\,e^{1/e+e-4/\pi-11\pi}\,\pi^{-17/2+17e}\csc^2\left(\frac{\frac{\pi t}{2}-e\,\pi\,t}{\frac{\pi}{2}-e\,\pi}\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-(e^2\pi^2)/(4s)+s}}{\sqrt{s}}\,ds+$$

$$\frac{1}{2}\,i\exp\left(\frac{1}{e}+e+2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{-1/144+\pi/6}\,\pi}-\frac{4}{\pi}-11\,\pi+\frac{\pi}{2\sqrt{6}}\right)$$

$$\pi^{-17/2+17e}\csc^2\left(\frac{\frac{\pi\left(\frac{\pi t}{2}-e\,\pi\,t\right)}{2\left(\frac{\pi}{2}-e\,\pi\right)}-\frac{e\,\pi\left(\frac{\pi t}{2}-e\,\pi\,t\right)}{\frac{\pi}{2}-e\,\pi}}{\frac{\pi}{2}-e\,\pi}\right)$$

$$\left.\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{e^{-(e^2\pi^2)/(4s)+s}}{\sqrt{s}}\,ds\right)dt\quad\text{for }\gamma>0$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=$$

$$\int_{\frac{\pi}{2}}^{e\,\pi}\left(4\,i\,e^{-1/1536+1/e+e-4/\pi-11\pi+(8\pi^2)/3}\,\pi^{-8+17e}\csc^2(t)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{2}{e\,\pi}\right)^{2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds-\right.$$

$$2\,i\,e^{1/e+e-4/\pi-11\pi}\,\pi^{-17/2+17e}\csc^2\left(\frac{\frac{\pi t}{2}-e\,\pi\,t}{\frac{\pi}{2}-e\,\pi}\right)\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{2}{e\,\pi}\right)^{2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds+$$

$$\frac{1}{2}\,i\exp\left(\frac{1}{e}+e+2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{-1/144+\pi/6}\,\pi}-\frac{4}{\pi}-11\pi+\frac{\pi}{2\sqrt{6}}\right)$$

$$\pi^{-17/2+17e}\csc^2\left(\frac{\frac{\pi\left(\frac{\pi t}{2}-e\,\pi\,t\right)}{2\left(\frac{\pi}{2}-e\,\pi\right)}-\frac{e\,\pi\left(\frac{\pi t}{2}-e\,\pi\,t\right)}{\frac{\pi}{2}-e\,\pi}}{\frac{\pi}{2}-e\,\pi}\right)$$

$$\left.\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{\left(\frac{2}{e\,\pi}\right)^{2s}\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds\right)dt\quad\text{for } 0<\gamma<\frac{1}{2}$$

Multiple-argument formulas

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\,\pi)\cot(e\,\pi)\right)=$$

$$\frac{1}{2}\,e^{1/e+e-4/\pi-11\pi}\left(-4+e^{2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{-1/144+\pi/6}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{-1/1536+(8\pi^2)/3}\sqrt{\pi}\right)$$

$$\pi^{-8+17e}\,T_e(-1)\left(\cot\left(\frac{e\,\pi}{2}\right)-\tan\left(\frac{e\,\pi}{2}\right)\right)$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\pi)\cot(e\pi)\right)= \frac{1}{2}\,e^{1/e+e-4/\pi-11\pi}\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{-1/144+\pi/6}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{-1/1536+(8\pi^2)/3}\sqrt{\pi}\right) \pi^{-8+17e}\left(-1+2\cos^2\left(\frac{e\pi}{2}\right)\right)\left(\cot\left(\frac{e\pi}{2}\right)-\tan\left(\frac{e\pi}{2}\right)\right)$$

$$\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{\pi/6-1/144}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}\right) e^{1/e+e-4/\pi-11\pi}\left(\pi^{17e-8}\cos(e\pi)\cot(e\pi)\right)= \frac{1}{2}\,e^{1/e+e-4/\pi-11\pi}\left(-4+e^{2\sqrt{\frac{6}{8087}}\,e^{1/2\sqrt{-1/144+\pi/6}\,\pi}+\frac{\pi}{2\sqrt{6}}}+8\,e^{-1/1536+(8\pi^2)/3}\sqrt{\pi}\right) \pi^{-8+17e}\left(1-2\sin^2\left(\frac{e\pi}{2}\right)\right)\left(\cot\left(\frac{e\pi}{2}\right)-\tan\left(\frac{e\pi}{2}\right)\right)$$

Multiplying the two expressions, we obtain:

(((((-1)^336 * (((exp(Pi*sqrt(337/6-1/144))/(2(sqrt(337-1/24))))+(((exp(Pi/2*sqrt(Pi/6-1/144)))/(sqrt(337-1/24))))))))))(((((4-[√(64π) * exp(π^2*1/(24(1/64))-(1/64)*1/24)])))))

Input

$$\left((-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{\pi}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)\right)\left(4-\sqrt{64\pi}\,\exp\left(\pi^2\times\frac{1}{24\times\frac{1}{64}}-\frac{1}{64}\times\frac{1}{24}\right)\right)$$

Exact result

$$\left(\sqrt{\frac{6}{8087}}\, e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi}\right)\left(4 - 8\, e^{\left(8\pi^2\right)/3-1/1536}\sqrt{\pi}\right)$$

Decimal approximation

$-1.7431892083179813176689809467692931369107720104217740050 11\ldots \times 10^{21}$

-1.7431892…*10^21

Alternate forms

$$-4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right)\left(2\, e^{\left(8\pi^2\right)/3-1/1536}\sqrt{\pi} - 1\right)$$

$$\frac{4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right)\left(\sqrt[1536]{e} - 2\, e^{\left(8\pi^2\right)/3}\sqrt{\pi}\right)}{\sqrt[1536]{e}}$$

$$4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right) - 8\, e^{\left(8\pi^2\right)/3-1/1536}\left(e^{\left(\sqrt{8087}\,\pi\right)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right)\sqrt{\frac{6\pi}{8087}}$$

Expanded form

$$4\sqrt{\frac{6}{8087}}\, e^{\left(\sqrt{8087}\,\pi\right)/12} + 8\sqrt{\frac{6}{8087}}\, e^{1/2\sqrt{\pi/6-1/144}\,\pi} - 8\, e^{-1/1536+\left(\sqrt{8087}\,\pi\right)/12+\left(8\pi^2\right)/3}\sqrt{\frac{6\pi}{8087}} - 16\, e^{-\frac{1}{1536}+\frac{1}{2}\sqrt{\frac{\pi}{6}-\frac{1}{144}}\,\pi+\frac{8\pi^2}{3}}\sqrt{\frac{6\pi}{8087}}$$

Series representations

$$\left(4-\sqrt{64\pi}\,\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.\right.$$
$$\left.\left.2\exp\left(\frac{1}{2}\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$
$$\left.\left(-4+\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(64\pi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/$$
$$\left.\left(2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

for (not ($z_0\in\mathbb{R}$ and $-\infty < z_0 \le 0$))

$$\left(4-\sqrt{64\pi}\,\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)$$

$$(-1)^{336}\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{144}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{144}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+\right.\right.\right.$$

$$2\exp\left(\frac{1}{2}\pi\exp\left(i\pi\left\lfloor\frac{\arg\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{144}+\frac{\pi}{6}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\left(-4+\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\exp\left(i\pi\left\lfloor\frac{\arg(64\pi-x)}{2\pi}\right\rfloor\right)\sqrt{x}\right.$$

$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k(64\pi-x)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/$$

$$\left(2\exp\left(i\pi\left\lfloor\frac{\arg\left(\frac{8087}{24}-x\right)}{2\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{8087}{24}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

for ($x \in \mathbb{R}$ and $x < 0$)

$$\left(4-\sqrt{64\pi}\,\exp\left(\frac{\pi^2}{\frac{24}{64}}-\frac{1}{64\times 24}\right)\right)(-1)^{336}$$

$$\left(\frac{\exp\left(\pi\sqrt{\frac{337}{6}-\frac{1}{144}}\right)}{2\sqrt{337-\frac{1}{24}}}+\frac{\exp\left(\frac{1}{2}\pi\sqrt{\frac{\pi}{6}-\frac{1}{144}}\right)}{\sqrt{337-\frac{1}{24}}}\right)=$$

$$-\left(\left(\left(\exp\left(\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{8087}{144}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(\frac{8087}{144}-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{144}-z_0\right)^k z_0^{-k}}{k!}\right)+\right.\right.\right.$$

$$\left.2\exp\left(\frac{1}{2}\pi\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2\left(1+\left\lfloor\arg\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)/(2\pi)\right\rfloor\right)} \sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(-\frac{1}{144}+\frac{\pi}{6}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

$$\left(\frac{1}{z_0}\right)^{-1/2\left\lfloor\arg\left(\frac{8087}{24}-z_0\right)/(2\pi)\right\rfloor} z_0^{-1/2-1/2\left\lfloor\arg\left(\frac{8087}{24}-z_0\right)/(2\pi)\right\rfloor}$$

$$\left.\left.\left(-4+\exp\left(-\frac{1}{1536}+\frac{8\pi^2}{3}\right)\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(64\pi-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(64\pi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(64\pi-z_0)^k z_0^{-k}}{k!}\right)\right)\right/$$

$$\left(2\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{8087}{24}-z_0\right)^k z_0^{-k}}{k!}\right)\right)$$

From which, (utilizing the alternate form)

$$-4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12}+2\,e^{1/24\pi\sqrt{24\pi-1}}\right)\left(2\,e^{\left(8\pi^2\right)/3-1/1536}\sqrt{\pi}-1\right)$$

-1/(((-5 + 30 π + 51 π^2)*1/(2 (π - 3)^2)))((-4 sqrt(6/8087) (e^(1/12 (sqrt(8087) π)) + 2 e^(1/24 π sqrt(24 π - 1))) (2 e^(1/3 (8 π^2) - 1/1536) sqrt(π) - 1)))

Where

$$\frac{-5+30\pi+51\pi^2}{2(\pi-3)^2} \approx 14779.11585683$$

Input

$$-\frac{-4\sqrt{\frac{6}{8087}}\left(e^{1/12\left(\sqrt{8087}\,\pi\right)}+2\,e^{1/24\pi\sqrt{24\pi-1}}\right)\left(2\,e^{\frac{1}{3}\left(8\pi^2\right)-\frac{1}{1536}}\sqrt{\pi}-1\right)}{\left(-5+30\pi+51\pi^2\right)\times\frac{1}{2(\pi-3)^2}}$$

Exact result

$$\frac{8\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12}+2\,e^{1/24\pi\sqrt{24\pi-1}}\right)\left(2\,e^{\left(8\pi^2\right)/3-1/1536}\sqrt{\pi}-1\right)(\pi-3)^2}{-5+30\pi+51\pi^2}$$

Decimal approximation

$1.1794949205382889036188648831098095984982435273976218812038 9\ldots \times 10^{17}$

$1.17949492\ldots*10^{17}$

p(337) =

= $1.17949491546113972 \times 10^{17}$

Alternate form

$$\frac{16\, e^{(8\pi^2)/3-1/1536} \left(e^{(\sqrt{8087}\,\pi)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right)(\pi-3)^2 \sqrt{\frac{6\pi}{8087}}}{-5+30\pi+51\pi^2} - \frac{8\sqrt{\frac{6}{8087}} \left(e^{(\sqrt{8087}\,\pi)/12} + 2\, e^{1/24\pi\sqrt{24\pi-1}}\right)(\pi-3)^2}{-5+30\pi+51\pi^2}$$

Expanded form

$$\frac{288\sqrt{\frac{6\pi}{8087}}\, \exp\left(-1/1536 + (8\pi^2)/3 + 1/24\,\pi\sqrt{24\pi-1}\right)}{-5+30\pi+51\pi^2} - \frac{192\sqrt{\frac{6}{8087}}\, \pi^{3/2} \exp\left(-1/1536 + (8\pi^2)/3 + 1/24\,\pi\sqrt{24\pi-1}\right)}{-5+30\pi+51\pi^2} + \frac{32\sqrt{\frac{6}{8087}}\, \pi^{5/2} \exp\left(-1/1536 + (8\pi^2)/3 + 1/24\,\pi\sqrt{24\pi-1}\right)}{-5+30\pi+51\pi^2} - \frac{72\sqrt{\frac{6}{8087}}\, e^{(\sqrt{8087}\,\pi)/12}}{-5+30\pi+51\pi^2} - \frac{144\sqrt{\frac{6}{8087}}\, e^{1/24\pi\sqrt{24\pi-1}}}{-5+30\pi+51\pi^2} + \frac{144\, e^{-1/1536+(\sqrt{8087}\,\pi)/12+(8\pi^2)/3}\sqrt{\frac{6\pi}{8087}}}{-5+30\pi+51\pi^2} + \frac{48\sqrt{\frac{6}{8087}}\, e^{(\sqrt{8087}\,\pi)/12}\,\pi}{-5+30\pi+51\pi^2} + \frac{96\sqrt{\frac{6}{8087}}\, e^{1/24\pi\sqrt{24\pi-1}}\,\pi}{-5+30\pi+51\pi^2} - \frac{96\sqrt{\frac{6}{8087}}\, e^{-1/1536+(\sqrt{8087}\,\pi)/12+(8\pi^2)/3}\,\pi^{3/2}}{-5+30\pi+51\pi^2} - \frac{8\sqrt{\frac{6}{8087}}\, e^{(\sqrt{8087}\,\pi)/12}\,\pi^2}{-5+30\pi+51\pi^2} - \frac{16\sqrt{\frac{6}{8087}}\, e^{1/24\pi\sqrt{24\pi-1}}\,\pi^2}{-5+30\pi+51\pi^2} + \frac{16\sqrt{\frac{6}{8087}}\, e^{-1/1536+(\sqrt{8087}\,\pi)/12+(8\pi^2)/3}\,\pi^{5/2}}{-5+30\pi+51\pi^2}$$

Series representations

$$-\frac{\left(4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)\left(2\,e^{\left(8\,\pi^2\right)/3-1/1536}\sqrt{\pi}-1\right)\right)(-1)}{\frac{-5+30\,\pi+51\,\pi^2}{2\,(\pi-3)^2}}=$$

$$\left(8\left(\exp\left(\frac{1}{12}\,\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(8087-z_0)^k\,z_0^{-k}}{k!}\right)+2\exp\left(\frac{1}{24}\,\pi\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(-1+24\,\pi-z_0)^k\,z_0^{-k}}{k!}\right)\right)(-3+\pi)^2\sqrt{z_0}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{6}{8087}-z_0\right)^k z_0^{-k}}{k!}\right)\left(-\sqrt[1536]{e}+2\,e^{\left(8\,\pi^2\right)/3}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k\,z_0^{-k}}{k!}\right)\right)\Big/\left(\sqrt[1536]{e}\left(-5+30\,\pi+51\,\pi^2\right)\right)\quad\text{for (not }(z_0\in\mathbb{R}\text{ and }-\infty<z_0\leq 0))$$

$$-\frac{\left(4\sqrt{\frac{6}{8087}}\left(e^{\left(\sqrt{8087}\,\pi\right)/12}+2\,e^{1/24\,\pi\sqrt{24\,\pi-1}}\right)\left(2\,e^{\left(8\,\pi^2\right)/3-1/1536}\sqrt{\pi}-1\right)\right)(-1)}{\frac{-5+30\,\pi+51\,\pi^2}{2\,(\pi-3)^2}}=$$

$$\left(8\left(\exp\left(\frac{1}{12}\,\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(8087-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(8087-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)+2\exp\left(\frac{1}{24}\,\pi\exp\left(i\,\pi\left\lfloor\frac{\arg(-1+24\,\pi-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(-1+24\,\pi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)(-3+\pi)^2\exp\left(i\,\pi\left\lfloor\frac{\arg\left(\frac{6}{8087}-x\right)}{2\,\pi}\right\rfloor\right)\sqrt{x}\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(\frac{6}{8087}-x\right)^k x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\left(-\sqrt[1536]{e}+2\,e^{\left(8\,\pi^2\right)/3}\exp\left(i\,\pi\left\lfloor\frac{\arg(\pi-x)}{2\,\pi}\right\rfloor\right)\sqrt{x}\sum_{k=0}^{\infty}\frac{(-1)^k(\pi-x)^k\,x^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(\sqrt[1536]{e}\left(-5+30\,\pi+51\,\pi^2\right)\right)\quad\text{for }(x\in\mathbb{R}\text{ and }x<0)$$

$$-\frac{\left(4\sqrt{\frac{6}{8087}}\left(e^{(\sqrt{8087}\,\pi)/12}+2\,e^{1/24\pi\sqrt{24\pi-1}}\right)\left(2\,e^{(8\pi^2)/3-1/1536}\sqrt{\pi}-1\right)\right)(-1)}{\frac{-5+30\pi+51\pi^2}{2(\pi-3)^2}}=$$

$$\left(8\left(\exp\left(\frac{1}{12}\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(8087-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(8087-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(8087-z_0)^k z_0^{-k}}{k!}\right)+\right.\right.$$
$$2\exp\left(\frac{1}{24}\pi\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(-1+24\pi-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(-1+24\pi-z_0)/(2\pi)\rfloor}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(-1+24\pi-z_0)^k z_0^{-k}}{k!}\right)\Bigg)$$
$$(-3+\pi)^2\left(\frac{1}{z_0}\right)^{1/2\left\lfloor\arg\left(\frac{6}{8087}-z_0\right)/(2\pi)\right\rfloor} z_0^{1/2+1/2\left\lfloor\arg\left(\frac{6}{8087}-z_0\right)/(2\pi)\right\rfloor}$$
$$\left(\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(\frac{6}{8087}-z_0\right)^k z_0^{-k}}{k!}\right)$$
$$\left(-\sqrt[1536]{e}+2\,e^{(8\pi^2)/3}\left(\frac{1}{z_0}\right)^{1/2\lfloor\arg(\pi-z_0)/(2\pi)\rfloor} z_0^{1/2+1/2\lfloor\arg(\pi-z_0)/(2\pi)\rfloor}\right.$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k(\pi-z_0)^k z_0^{-k}}{k!}\right)\right)\Big/\left(\sqrt[1536]{e}\left(-5+30\pi+51\pi^2\right)\right)$$

With regard p(337) = $1.17949491546113972\times 10^{17}$, we have obtained various results mathematically connected with this value. This could further support the proposal that the number of partitions of an integer is related to the entropy value of a black hole of any mass.

From the following previous expression:

$$4.777039278893 \times 10^{27} \times 1 \Bigg/ \left(\frac{1}{(1.94973 \times 10^{13})^2} \sqrt{1 - 1 + \frac{(1.12496 \times 10^{15})^2}{(1.94973 \times 10^{13})^2}} \; (3.610198446259 \times 10^{13} + 2.607797769259 \times 10^{35}) \right)$$

we have also:

(89+2)/(((ln((4.777039278893e+27 * 1/((((1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259e+13+2.607797769259e+35)))))))+16)))

Input interpretation

$$(89+2) \Bigg/ \left(\log\left(4.777039278893 \times 10^{27} \times 1 \Bigg/ \left(\frac{1}{(1.94973 \times 10^{13})^2} \sqrt{1 - 1 + \frac{(1.12496 \times 10^{15})^2}{(1.94973 \times 10^{13})^2}} \; (3.610198446259 \times 10^{13} + 2.607797769259 \times 10^{35}) \right) \right) + 16 \right)$$

$\log(x)$ is the natural logarithm

Result

1.6446178959046031099201087886534850616013649053337800774636386457...

$1.6446178959\ldots\ldots \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934\ldots$

Or:

((4.777039278893e+27 * 1/((((1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259e+13+2.607797769259e+35)))))))^1/79

Input interpretation

$$\left(4.777039278893\times 10^{27}\times 1\Big/\left(\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\,(3.610198446259\times 10^{13}+2.607797769259\times 10^{35})\right)\right)\verb|^|(1/79)$$

Result

1.6452188873899244218112473269944905052324874582800098430887588870...

1.64521888738…. $\approx \zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

And:

((4.777039278893e+27 * 1/((((1/(1.94973e+13)^2*sqrt(((1-1+(1.12496e+15)^2/(1.94973e+13)^2)))*(3.610198446259e+13+2.607797769259e+35)))))))^1/78

Input interpretation

$$\left(4.777039278893\times 10^{27}\times 1\Big/\left(\frac{1}{(1.94973\times 10^{13})^2}\sqrt{1-1+\frac{(1.12496\times 10^{15})^2}{(1.94973\times 10^{13})^2}}\,(3.610198446259\times 10^{13}+2.607797769259\times 10^{35})\right)\right)\verb|^|(1/78)$$

Result

1.6557538943540047408752187977362040113736609539364581851682355458...

1.655753894…. result that is very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Indeed, from:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

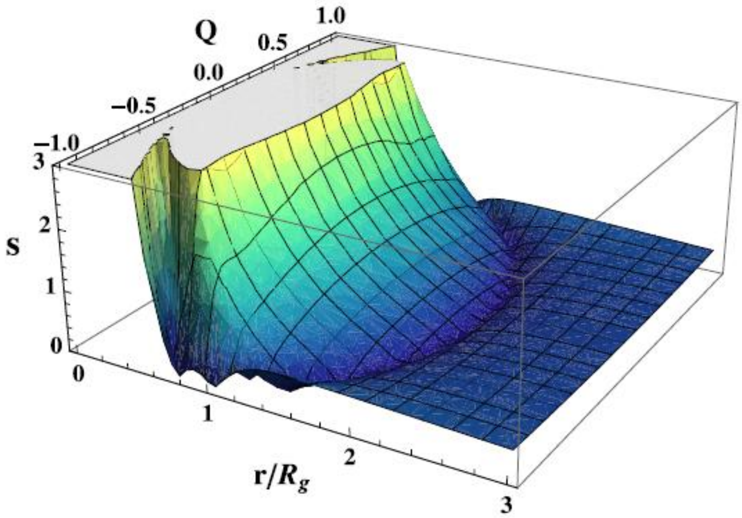
$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}=\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. $\square$

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

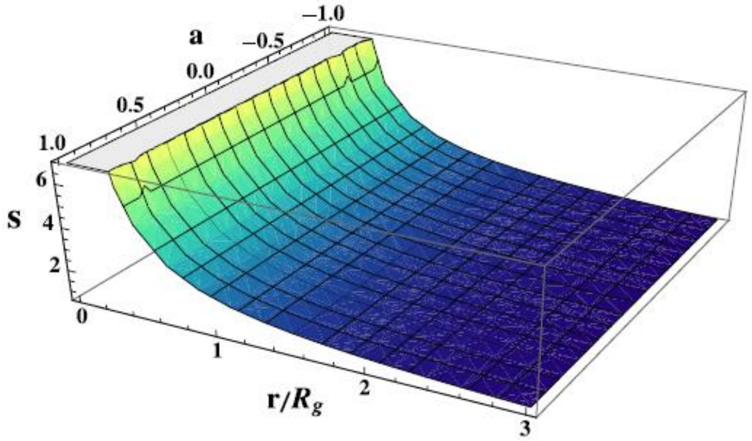
We have that:

Fig. 1 Entropy density of a Reissner-Nordström black hole. Here, $c = G = k_{RN} = 1$, $M = 1$



and:

Fig. 6 Entropy density of a Kerr black hole as a function of the radial coordinate and the angular momentum. Here, $c = G = k_K = 1$, and $\theta = \pi/2$



For:

r = 1.94973e+13 ;   M = 13.12806e+39 ; a = 1/24 = 0.0416666…

From:

$$\mathfrak{s} = k_{\mathrm{K}} \left| \frac{4r}{a^2 + 2r^2 + a^2 \cos 2\theta} \right|.$$

we obtain:

(4*1.94973e+13)/((((1/24)^2+2*(1.94973e+13)^2+(1/24)^2 cos(2*Pi/2))))

Input interpretation

$$\frac{4 \times 1.94973 \times 10^{13}}{\left(\frac{1}{24}\right)^2 + 2\left(1.94973 \times 10^{13}\right)^2 + \left(\frac{1}{24}\right)^2 \cos\left(2 \times \frac{\pi}{2}\right)}$$

Result

1.0257830571412451980530637575459166140952849881778502664471... × 10^{-13}

1.02578305714…*10^-13

From which:

48/((colog(((4*1.94973e+13)/((((1/24)^2+2*(1.94973e+13)^2+(1/24)^2 cos(2*Pi/2))))))-0.910))

where 0.910 is in the range of the omega meson Regge slope

ω	6	$m_{u/d} = 0 - 60$	$0.910 - 0.918$	$0.45 - 0.50$

Input interpretation

$$\frac{48}{-\log\left(\frac{4\times 1.94973\times 10^{13}}{\left(\frac{1}{24}\right)^2+2\left(1.94973\times 10^{13}\right)^2+\left(\frac{1}{24}\right)^2 \cos\left(2\times\frac{\pi}{2}\right)}\right)-0.91}$$

log(x) is the natural logarithm

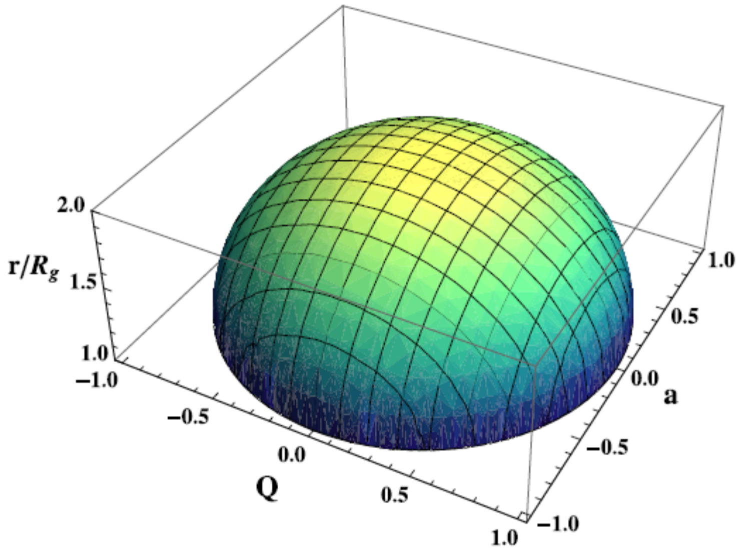
Result

1.6552780131207934012929526717513701739171240549101462713616677424...

1.655278….. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Now, we have that:

Fig. 7 Radii of the outer horizon for the Kerr-Newman space-time. Here, $c = G = 1$, $M = 1$



Since the Kerr-Newman space-time is a non-vacuum solution of Einstein's field equations because of the presence of an electromagnetic field, the Weyl and Kretschmann scalars are not equal. The calculation of the scalar P yields:

$$P^2 = \frac{W}{R}, \qquad P = \sqrt{\frac{W}{R}} = \sqrt{\frac{A}{B}}, \tag{67}$$

where:

$$\begin{aligned} A = &-48(M^2\xi^6 + 10\xi^4 rMQ^2 - \xi^4 Q^4 - 15\xi^4 M^2 r^2 + 6\xi^2 Q^4 r^2 + 15r^4 M^2 \xi^2 \\ &- 20MQ^2 r^3 \xi^2 - M^2 r^6 + 2Mr^5 Q^2 - Q^4 r^4), \end{aligned} \tag{68}$$

$$\begin{aligned} B = &-8(-6M^2 r^6 + 90\xi^2 r^4 M^2 - 90\xi^4 M^2 r^2 + 6\xi^6 M^2 + 12r^5 Q^2 M \\ &- 120\xi^2 MQ^2 r^3 + 60M\xi^4 Q^2 r - 7Q^4 r^4 + 34\xi^2 Q^4 r^2 - 7\xi^4 Q^4), \end{aligned} \tag{69}$$

and,

$$\xi = a\cos\theta. \tag{70}$$

We compute the entropy density using (56). The function we find, however, is singular for certain values of the radius:

$$\mathfrak{s} = k_{\mathrm{KN}} \frac{1}{2} \left| \left[\left(\frac{1}{g} \sqrt{A} g' + \frac{A'}{\sqrt{A}} \right) \frac{1}{\sqrt{B}} - \left(B' \sqrt{\frac{A}{B^3}} \right) \right] \right|, \tag{71}$$

For:

$a = 0.5, \theta = \pi/4, Q = 0.6$, and $M = 1$

0.5 cos(Pi/4)

Input

$$0.5 \cos\left(\frac{\pi}{4}\right)$$

Result

0.353553…

ξ = 0.353553…

Alternative representations

$$0.5 \cos\left(\frac{\pi}{4}\right) = 0.5 \cosh\left(\frac{i \pi}{4}\right)$$

$$0.5 \cos\left(\frac{\pi}{4}\right) = 0.5 \cosh\left(-\frac{i \pi}{4}\right)$$

$$0.5 \cos\left(\frac{\pi}{4}\right) = \frac{0.5}{\sec\left(\frac{\pi}{4}\right)}$$

Series representations

$$0.5 \cos\left(\frac{\pi}{4}\right) = 0.5 \sum_{k=0}^{\infty} \frac{\left(-\frac{1}{16}\right)^k \pi^{2k}}{(2k)!}$$

$$0.5 \cos\left(\frac{\pi}{4}\right) = 0.5 \pi \sum_{k=0}^{\infty} \frac{(-1)^k 4^{-1-2k} (-\pi)^{2k}}{(1+2k)!}$$

$$0.5\cos\left(\frac{\pi}{4}\right) \propto \frac{0.5\sum_{k=0}^{\infty}(-1)^k \frac{\partial^{1+2k}}{\partial\left(\frac{\pi}{4}\right)^{1+2k}}\delta\left(\frac{\pi}{4}\right)}{\theta\left(\frac{\pi}{4}\right)}$$

Integral representations

$$0.5\cos\left(\frac{\pi}{4}\right) = -0.5\int_{\frac{\pi}{2}}^{\frac{\pi}{4}}\sin(t)\,dt$$

$$0.5\cos\left(\frac{\pi}{4}\right) = 0.5 - 0.125\,\pi\int_0^1 \sin\left(\frac{\pi\,t}{4}\right)dt$$

$$0.5\cos\left(\frac{\pi}{4}\right) = \frac{0.25\sqrt{\pi}}{i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{e^{-\pi^2/(64\,s)+s}}{\sqrt{s}}\,ds \quad \text{for } \gamma > 0$$

$$0.5\cos\left(\frac{\pi}{4}\right) = \frac{0.25\sqrt{\pi}}{i\,\pi}\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{64^s\,\pi^{-2\,s}\,\Gamma(s)}{\Gamma\left(\frac{1}{2}-s\right)}\,ds \quad \text{for } 0 < \gamma < \frac{1}{2}$$

Multiple-argument formulas

$$0.5\cos\left(\frac{\pi}{4}\right) = -0.5 + \cos^2\left(\frac{\pi}{8}\right)$$

$$0.5\cos\left(\frac{\pi}{4}\right) = 0.5 - \sin^2\left(\frac{\pi}{8}\right)$$

$$0.5\cos\left(\frac{\pi}{4}\right) = -1.5\cos\left(\frac{\pi}{12}\right) + 2\cos^3\left(\frac{\pi}{12}\right)$$

For : ξ = 0.353553; r = 1.94973e+13

$a = 0.5, \theta = \pi/4, Q = 0.6$, and $M = 1$

From:

$$A = -48(M^2\xi^6 + 10\xi^4 r M Q^2 - \xi^4 Q^4 - 15\xi^4 M^2 r^2 + 6\xi^2 Q^4 r^2 + 15 r^4 M^2 \xi^2 - 20 M Q^2 r^3 \xi^2 - M^2 r^6 + 2 M r^5 Q^2 - Q^4 r^4),$$

developing and simplifying, we obtain:

-48[(0.001953+10*0.01562(1.9497e+13)*0.36-0.01562*0.1296-15*0.01562(3.e+26)+6*0.1249*0.1296(3.8e+26)+15(1.445e+53)*0.1249-20*0.36(7.411e+39)*0.1249-(5.4929e+79)+2(2.8173e+66)*0.36-0.1296(1.445e+53))]

Input interpretation

$$-48\left(0.001953 + 10\times 0.01562\left(1.9497\times 10^{13}\times 0.36\right) - 0.01562\times 0.1296 - 15\times 0.01562\times 3\times 10^{26} + 6\times 0.1249\times 0.1296\times 3.8\times 10^{26} + 15\times 1.445\times 10^{53}\times 0.1249 - 20\times 0.36\left(7.411\times 10^{39}\times 0.1249\right) - 5.4929\times 10^{79} + 2\times 2.8173\times 10^{66}\times 0.36 - 0.1296\times 1.445\times 10^{53}\right)$$

Result

$2.63659199999999026341119999879043096000003198990758400016024\ldots \times 10^{81}$

$2.636591999\ldots*10^{81}$

For : $\xi = 0.353553$; $r = 1.94973e+13$

$a = 0.5, \theta = \pi/4,\ Q = 0.6$, and $M = 1$

From:

$$B = -8(-6M^2r^6 + 90\xi^2r^4M^2 - 90\xi^4M^2r^2 + 6\xi^6M^2 + 12r^5Q^2M \\ - 120\xi^2MQ^2r^3 + 60M\xi^4Q^2r - 7Q^4r^4 + 34\xi^2Q^4r^2 - 7\xi^4Q^4),$$

developing and simplifying, we obtain:

-8(((-6(5.493e+79)+90*0.12496(1.445e+53)-90-0.01561(3.801e+26)+(0.0117)+12(2.817e+66)*0.36-120*0.12496*0.36(7.411e+39)+2.79936*1.94973e+13 – 0.9072(1.445e+53)+0.550623(3.801e+26)-0.10927*0.1296)))

Input interpretation

$$-8\left(-6\times 5.493\times 10^{79} + 90\times 0.12496\times 1.445\times 10^{53} - 90 - 0.01561\times 3.801\times 10^{26} + 0.0117 + 12\times 2.817\times 10^{66}\times 0.36 - 120\times 0.12496\times 0.36\times 7.411\times 10^{39} + 2.79936\times 1.94973\times 10^{13} - 0.9072\times 1.445\times 10^{53} + 0.550623\times 3.801\times 10^{26} - 0.10927\times 0.1296\right)$$

Result

$2.6366399999999902644479999988047884800000320052750335998373 13\ldots \times 10^{81}$

$2.63663999\ldots*10^{81}$ result similar to the previous one

From:

$$P = \sqrt{\frac{W}{R}} = \sqrt{\frac{A}{B}},$$

sqrt(2.6365919999999026341 × 10^81 / 2.6366399999999026444 × 10^81)

Input interpretation

$$\sqrt{\frac{2.6365919999999026341 \times 10^{81}}{2.6366399999999026444 \times 10^{81}}}$$

Result

0.99999089746448854250…

0.9999908974….

From which:

((2.6365919999999026341 × 10^81 / 2.6366399999999026444 × 10^81))^(97/2)

Input interpretation

$$\left(\frac{2.6365919999999026341 \times 10^{81}}{2.6366399999999026444 \times 10^{81}}\right)^{97/2}$$

Result

0.9991174397722460144…

0.9991174397…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

Now, we have that:

Fig. 8 Entropy density of a Kerr-Newman black-hole as a function of the radial coordinate and the angular momentum. Here, $c = G = k_K = 1$, $\theta = \pi/2$, and $Q = 0.6$

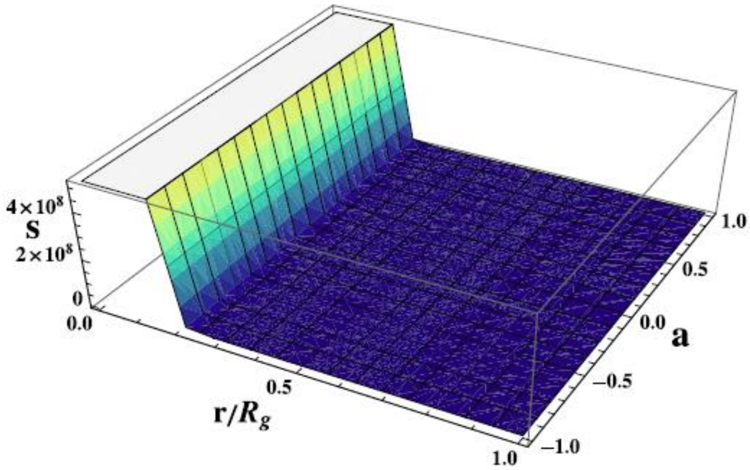
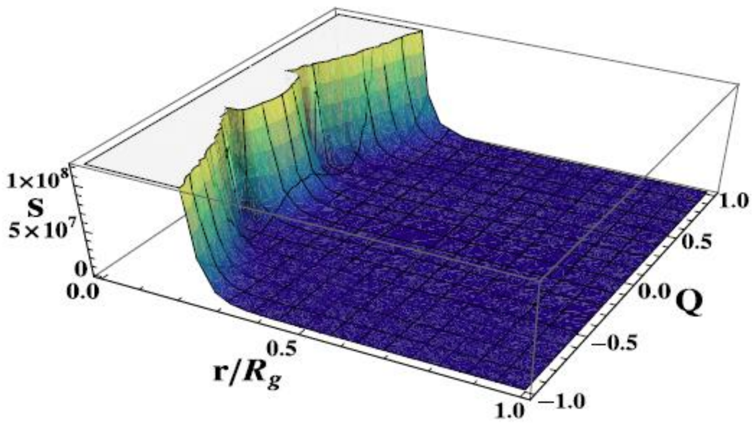


Fig. 9 Entropy density of a Kerr-Newman black-hole as a function of the radial coordinate and the charge. Here, $c = G = k_K = 1$, $\theta = \pi/2$, and $a = 0.6$



From:

$$\mathfrak{s} = \left| \frac{192r(10a^6\cos^6\theta - 45a^4\cos^4\theta r^2 + 24r^4a^2\cos^2\theta - r^6)}{(r^2 + a^2\cos^2\theta)^7} \right|. \tag{82}$$

For: a = 0.6 ; θ = π / 2 ; r = 1.94973e+13

192*1.94973e+13[(((10*0.6^6 cos^6(Pi/2) – 45*0.6^4 cos^4(Pi/2)*(1.94973e+13)^2+24(1.94973e+13)^4*0.6^2 cos^2(Pi/2) - (1.94973e+13)^6)))] / [((((((1.94973e+13)^2+0.6^2 cos^2(Pi/2))^7)))]

Input interpretation

$$192 \times 1.94973 \times 10^{13} \times \left(10 \times 0.6^6 \cos^6\left(\frac{\pi}{2}\right) - \left(45 \times 0.6^4\right) \left(\cos^4\left(\frac{\pi}{2}\right) \left(1.94973 \times 10^{13}\right)^2\right) + 24 \left(1.94973 \times 10^{13}\right)^4 \times 0.6^2 \cos^2\left(\frac{\pi}{2}\right) - \left(1.94973 \times 10^{13}\right)^6\right) \Big/ \left(\left(1.94973 \times 10^{13}\right)^2 + 0.6^2 \cos^2\left(\frac{\pi}{2}\right)\right)^7$$

Result

$-1.7925856268708728914653212344674458379936873406200781200 3\ldots \times 10^{-91}$

$-1.7925856268*10^{-91}$

From which:

colog((192*1.94973e+13[(((10*0.6^6 cos^6(Pi/2) – 45*0.6^4 cos^4(Pi/2)*(1.94973e+13)^2+24(1.94973e+13)^4*0.6^2 cos^2(Pi/2) - (1.94973e+13)^6)))] / [((((((1.94973e+13)^2+0.6^2 cos^2(Pi/2))^7)))]))

Input interpretation

$$-\log\left(192 \times 1.94973 \times 10^{13} \times \left(10 \times 0.6^6 \cos^6\left(\frac{\pi}{2}\right) - \left(45 \times 0.6^4\right) \left(\cos^4\left(\frac{\pi}{2}\right) \left(1.94973 \times 10^{13}\right)^2\right) + 24 \left(1.94973 \times 10^{13}\right)^4 \times 0.6^2 \cos^2\left(\frac{\pi}{2}\right) - \left(1.94973 \times 10^{13}\right)^6\right) \Big/ \left(\left(1.94973 \times 10^{13}\right)^2 + 0.6^2 \cos^2\left(\frac{\pi}{2}\right)\right)^7\right)$$

$\log(x)$ is the natural logarithm

Result

$208.952\ldots - 3.14159\ldots i$

Polar coordinates

$r = 208.975$ (radius), $\theta = -0.0150339$ (angle)

208.975

And:

8colog((192*1.94973e+13[(((10*0.6^6 cos^6(Pi/2) – 45*0.6^4 cos^4(Pi/2)*(1.94973e+13)^2+24(1.94973e+13)^4*0.6^2 cos^2(Pi/2) - (1.94973e+13)^6)))] / [((((((1.94973e+13)^2+0.6^2 cos^2(Pi/2))^7)))]))+64-7

Input interpretation

$$8\left(-\log\left(192\times 1.94973\times 10^{13}\times \left(10\times 0.6^6\cos^6\left(\frac{\pi}{2}\right)-(45\times 0.6^4)\left(\cos^4\left(\frac{\pi}{2}\right)(1.94973\times 10^{13})^2\right)+24\,(1.94973\times 10^{13})^4\times 0.6^2\cos^2\left(\frac{\pi}{2}\right)-(1.94973\times 10^{13})^6\right)\Big/\left(\left((1.94973\times 10^{13})^2+0.6^2\cos^2\left(\frac{\pi}{2}\right)\right)^7\right)\right)\right)+64-7$$

$\log(x)$ is the natural logarithm

Result

$1728.61\ldots - 25.1327\ldots i$

Polar coordinates

$r = 1728.8$ (radius), $\theta = -0.0145382$ (angle)

$1728.8 \approx 1729$

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. ($1728 = 8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

(1728.61 -25.1327 i)^1/15

Input interpretation

$$\sqrt[15]{1728.61 + i \times (-25.1327)}$$

i is the imaginary unit

Result

1.643801… −
0.001593198… i

Polar coordinates

$r = 1.6438$ (radius), $\theta = -0.000969215$ (angle)

$1.6438 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

((1/27(1728.61 -25.1327 i)))^2+276-3-Φ

Input interpretation

$$\left(\frac{1}{27}(1728.61 + i \times (-25.1327))\right)^2 + 276 - 3 - \Phi$$

i is the imaginary unit

Φ is the golden ratio conjugate

Result

4370.41… −
119.190… i

Polar coordinates

$r = 4372.03$ (radius), $\theta = -0.0272652$ (angle)

$4372.03 \approx 4372$

where 4372 is a value indicated in the fundamental Ramanujan paper "**Modular equations and Approximations to π**"

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Now, we have:

We compute the entropy density using (56). The result is:

$$\mathfrak{s} = \left| -\frac{96\, k_{\mathrm{KN}}}{(r^2 + a^2\cos^2\theta)^7}(s_1 + s_2 - s_3 + s_4) \right|, \tag{80}$$

and:

$$\begin{aligned} s_1 &= 5\cos^6\theta a^6 Q^2 M - 20\cos^6\theta a^6 r M^2 + 90\cos^4\theta M^2 r^3, \\ s_2 &= 11\cos^4\theta a^4 Q^4 r - 75\cos^4\theta a^4 Q^2 m r^2 - 26\cos^2\theta a^2 Q^4 r^3, \\ s_3 &= 48\cos^2\theta a^2 r^5 M^2 + 75\cos^2\theta a^2 r^4 Q^2 M, \\ s_4 &= 3r^5 Q^4 + 2r^7 M^2 - 5r^6 Q^2 M. \end{aligned}$$

Fig. 8 Entropy density of a Kerr-Newman black-hole as a function of the radial coordinate and the angular momentum. Here, $c = G = k_K = 1$, $\theta = \pi/2$, and $Q = 0.6$

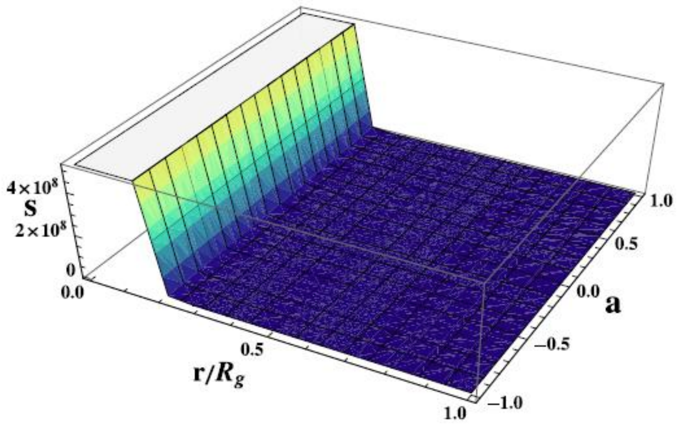
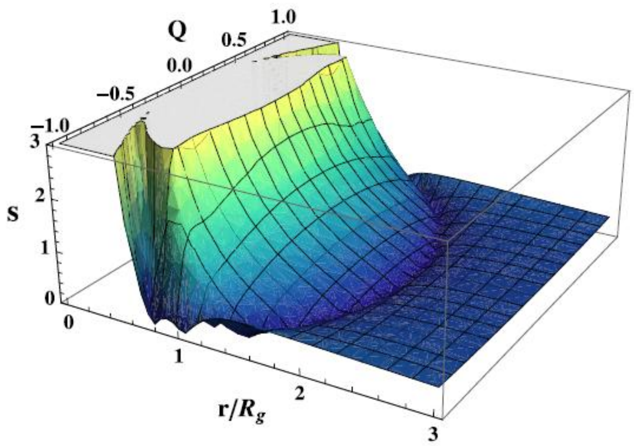


Fig. 1 Entropy density of a Reissner-Nordström black hole. Here, $c = G = k_{RN} = 1$, $M = 1$



For:

m = 1; Q = 0.6; θ = π/2; a = 0.5:

From:

$$s_1 = 5\cos^6\theta a^6 Q^2 M - 20\cos^6\theta a^6 r M^2 + 90\cos^4\theta M^2 r^3,$$

we obtain:

5 cos^6(Pi/4) (0.5)^6 0.6^2 – 20 cos^6(Pi/4) (0.5)^6 (1.94973e+13) + 90 cos^4(Pi/4) (1.94973e+13)^3

Input interpretation

$$5\cos^6\left(\frac{\pi}{4}\right)\times 0.5^6\times 0.6^2 - 20\cos^6\left(\frac{\pi}{4}\right)\times 0.5^6\times 1.94973\times 10^{13} + 90\cos^4\left(\frac{\pi}{4}\right)\left(1.94973\times 10^{13}\right)^3$$

Result

$1.66765396532519632499999999999238386718750003515625 \times 10^{41}$

$1.6676539\ldots{*}10^{41}$

From:

$$s_2 = 11\cos^4\theta a^4 Q^4 r - 75\cos^4\theta a^4 Q^2 m r^2 - 26\cos^2\theta a^2 Q^4 r^3,$$

11 cos^4(Pi/4) (0.5)^4 * (0.6)^4 * (1.94973e+13) – 75 cos^4(Pi/4) (0.5)^4 (0.6)^2 (1.94973e+13)^2 – 26 cos^2(Pi/4) (0.5)^2 * (0.6)^4 * (1.94973e+13)^3

Input interpretation

$$11\cos^4\left(\frac{\pi}{4}\right)\left(0.5^4\times 0.6^4\times 1.94973\times 10^{13}\right) - 75\cos^4\left(\frac{\pi}{4}\right)\times 0.5^4\times 0.6^2\left(1.94973\times 10^{13}\right)^2 - 26\cos^2\left(\frac{\pi}{4}\right)\left(0.5^2\times 0.6^4\left(1.94973\times 10^{13}\right)^3\right)$$

Result

$-3\,121\,848\,223\,088\,927\,893\,948\,387\,968\,315\,697\,642\,500$

$-3.1218482230889278939483879683156976425\times 10^{39}$

From:

$$s_3 = 48\cos^2\theta a^2 r^5 M^2 + 75\cos^2\theta a^2 r^4 Q^2 M,$$

48 cos^2(Pi/4) (0.5)^2 (1.94973e+13)^5 + 75 cos^2(Pi/4) (0.5)^2 (1.94973e+13)^4 (0.6)^2

Input interpretation

$$48\cos^2\left(\frac{\pi}{4}\right)\times 0.5^2\left(1.94973\times 10^{13}\right)^5 + 75\cos^2\left(\frac{\pi}{4}\right)\times 0.5^2\left(1.94973\times 10^{13}\right)^4\times 0.6^2$$

Result

16905328760255276164682437604254611337500000000000000000000.
000000000

Scientific notation

$1.6905328760255276164682437604254611337\times 10^{67}$

$1.690532876\ldots*10^{67}$

From:

$$s_4 = 3r^5 Q^4 + 2r^7 M^2 - 5r^6 Q^2 M.$$

3*(1.94973e+13)^5*(0.6)^4 + 2*(1.94973e+13)^7 – 5*(1.94973e+13)^6*(0.6)^2

Input interpretation

$$3\left(1.94973\times 10^{13}\right)^5\times 0.6^4 + 2\left(1.94973\times 10^{13}\right)^7 - 5\left(1.94973\times 10^{13}\right)^6\times 0.6^2$$

Result

2142157084402659497070551502655876192490295410934754249584000.
000000000000000000000000000000000000

Scientific notation

$2.142157084402659497070551502655876192490295410934754249584 \times 10^{93}$

$2.1421570844....*10^{93}$

Thence, we have from:

$$\mathfrak{s} = \left| -\frac{96\, k_{\mathrm{KN}}}{(r^2 + a^2 \cos^2\theta)^7} (s_1 + s_2 - s_3 + s_4) \right|,$$

For m = 1; Q = 0.6; θ = π/2; a = 0.5:

(-96/((1.94973e+13)^2+(0.5)^2 cos^2(Pi/4))^7 * (1.667653965325*10^41-3.12184822308*10^39-1.69053287602*10^67+2.1421570844026*10^93)

Input interpretation

$$-\frac{96}{\left((1.94973 \times 10^{13})^2 + 0.5^2 \cos^2\left(\frac{\pi}{4}\right)\right)^7} \left(1.667653965325 \times 10^{41} - 3.12184822308 \times 10^{39} - 1.69053287602 \times 10^{67} + 2.1421570844026 \times 10^{93}\right)$$

Result

$-1.792585626870740357344526472498785325313586364294619921 99... \times 10^{-91}$

$-1.79258562...*10^{-91}$

From which:

ln(-96/((1.94973e+13)^2+(0.5)^2 cos^2(Pi/4))^7 * (1.667653965325*10^41-3.12184822308*10^39-1.69053287602*10^67+2.1421570844026*10^93))

Input interpretation

$$\log\left(-\frac{96}{\left((1.94973\times10^{13})^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times10^{41}-3.12184822308\times10^{39}-1.69053287602\times10^{67}+2.1421570844026\times10^{93}\right)\right)$$

$\log(x)$ is the natural logarithm

Result

$-208.952\ldots+3.14159\ldots i$

Polar coordinates

$r=208.975$ (radius), $\theta=3.12656$ (angle)

208.975 result equal to the previous solution of the following expression:

$$-\log\left(192\times1.94973\times10^{13}\times\left(10\times0.6^6\cos^6\left(\frac{\pi}{2}\right)-(45\times0.6^4)\left(\cos^4\left(\frac{\pi}{2}\right)(1.94973\times10^{13})^2\right)+24\,(1.94973\times10^{13})^4\times0.6^2\cos^2\left(\frac{\pi}{2}\right)-(1.94973\times10^{13})^6\right)\Big/\left((1.94973\times10^{13})^2+0.6^2\cos^2\left(\frac{\pi}{2}\right)\right)^7\right)$$

$\log(x)$ is the natural logarithm

$208.952\ldots-3.14159\ldots i$

$r=208.975$ (radius), $\theta=-0.0150339$ (angle)

208.975

and:

8colog(((-96/((1.94973e+13)^2+(0.5)^2 cos^2(Pi/4))^7 * (1.667653965325*10^41-3.12184822308*10^39-1.69053287602*10^67+2.1421570844026*10^93))))+64-7

Input interpretation

$$8\left(-\log\left(-\frac{96}{\left(\left(1.94973\times10^{13}\right)^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times10^{41}-3.12184822308\times10^{39}-1.69053287602\times10^{67}+2.1421570844026\times10^{93}\right)\right)\right)+64-7$$

log(x) is the natural logarithm

Result

1728.61… −
25.1327… i

Polar coordinates

$r = 1728.8$ (radius), $\theta = -0.0145382$ (angle)

1728.8 ≈ 1729

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. (1728 = $8^2 * 3^3$) The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

((8colog(((-96/((1.94973e+13)^2+(0.5)^2 cos^2(Pi/4))^7 * (1.667653965325*10^41-3.12184822308*10^39-1.69053287602*10^67+2.1421570844026*10^93))))+64-7))^1/15

Input interpretation

$$\left(8\left(-\log\left(-\frac{96}{\left((1.94973\times10^{13})^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times10^{41}-3.12184822308\times10^{39}-1.69053287602\times10^{67}+2.1421570844026\times10^{93}\right)\right)\right)+64-7\right)\text{^}(1/15)$$

log(x) is the natural logarithm

Result

1.6438015… −
0.0015931982… i

Polar coordinates

$r = 1.6438$ (radius), $\theta = -0.000969215$ (angle)

$1.6438 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

(1/27(((8colog(((-96/((1.94973e+13)^2+(0.5)^2 cos^2(Pi/4))^7 * (1.667653965325*10^41-3.12184822308*10^39-1.69053287602*10^67+2.1421570844026*10^93))))+64-7))))^2+276-3-Φ

Input interpretation

$$\left(\frac{1}{27}\left(8\left(-\log\left(-\frac{96}{\left((1.94973\times10^{13})^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times10^{41}-3.12184822308\times10^{39}-1.69053287602\times10^{67}+2.1421570844026\times10^{93}\right)\right)\right)+64-7\right)\right)^2+276-3-\Phi$$

log(x) is the natural logarithm

Φ is the golden ratio conjugate

Result

4370.42… −
119.190… i

Polar coordinates

$r = 4372.05$ (radius), $\theta = -0.0272652$ (angle)

$4372.05 \approx 4372$

where 4372 is a value indicated in the fundamental Ramanujan paper "**Modular equations and Approximations to π**"

Hence

$$64g_{22}^{24} = e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots,$$
$$64g_{22}^{-24} = 4096e^{-\pi\sqrt{22}} + \cdots,$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

From the two previous expressions:

$$-8\left(-6\times 5.493\times 10^{79} + 90\times 0.12496\times 1.445\times 10^{53} - 90 - 0.01561\times 3.801\times 10^{26} + 0.0117 + 12\times 2.817\times 10^{66}\times 0.36 - 120\times 0.12496\times 0.36\times 7.411\times 10^{39} + 2.79936\times 1.94973\times 10^{13} - 0.9072\times 1.445\times 10^{53} + 0.550623\times 3.801\times 10^{26} - 0.10927\times 0.1296\right)$$

Result

$2.63663999999990264447999998804788480000032005275033599837313\ldots \times 10^{81}$

$2.63663999\ldots*10^{81}$

And:

$$-\frac{96}{\left((1.94973\times10^{13})^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times10^{41}-3.12184822308\times10^{39}-1.69053287602\times10^{67}+2.1421570844026\times10^{93}\right)$$

Result

$-1.7925856268707403573445264724987853253135863642946199 2199\ldots\times 10^{-91}$

-1.79258562…*10^-91

we have also:

(1/(-1.7925856268e-91) * 1/2.63663999999990264 × 10^81)

Input interpretation

$$-\frac{1}{1.7925856268\times10^{-91}}\times\frac{1}{2.63663999999990264\times10^{81}}$$

Result

$-2.1157738918419956247385692633992573020048976513803169127439\ldots\times 10^{9}$

-2115773891.84199562473856

And from:

$$s_4 = 3r^5Q^4 + 2r^7M^2 - 5r^6Q^2M.$$

3*(1.94973e+13)^5*(0.6)^4 + 2*(1.94973e+13)^7 – 5*(1.94973e+13)^6*(0.6)^2

$$3\,(1.94973\times10^{13})^5\times0.6^4+2\,(1.94973\times10^{13})^7-5\,(1.94973\times10^{13})^6\times0.6^2$$

2.1421570844….*10^93

And

$$-\frac{96}{\left(\left(1.94973\times 10^{13}\right)^2+0.5^2\cos^2\left(\frac{\pi}{4}\right)\right)^7}\left(1.667653965325\times 10^{41}-3.12184822308\times 10^{39}-1.69053287602\times 10^{67}+2.1421570844026\times 10^{93}\right)$$

Result

$-1.79258562687074035734452647249878532531358636429461992199\ldots\times 10^{-91}$

-1.79258562…*10^{-91}

((3*(1.94973e+13)^5*(0.6)^4 + 2*(1.94973e+13)^7 – 5*(1.94973e+13)^6*(0.6)^2)) * (-1.7925856268e-91)

Input interpretation

$$\left(3\left(1.94973\times 10^{13}\right)^5\times 0.6^4+2\left(1.94973\times 10^{13}\right)^7-5\left(1.94973\times 10^{13}\right)^6\times 0.6^2\right)\left(-1.7925856268\times 10^{-91}\right)$$

Result

$-383.99999998480018781431873292100656892184136521276400203944982 79\ldots$

-383.9999999848……

Dividing the two results, we obtain:

(-2115773891.84199562473856/-383.999999984800187)

Input interpretation

$$\frac{-2.11577389184199562473856\times 10^9}{-383.999999984800187}$$

Result

$5.509827843556624941726078005274406986728083333031667574246 08\ldots \times 10^6$

5509827.843556.....

From which:

1/28(-2115773891.84199562473856/-383.999999984800187)+21*5-0.5683000031

where 0.5683000031 is the value of the following Rogers-Ramanujan continued fraction:

$$4\int_0^\infty \frac{t\,dt}{e^{\sqrt{5}t}\cosh t} = \cfrac{1}{1+\cfrac{1^2}{1+\cfrac{1^2}{1+\cfrac{2^2}{1+\cfrac{2^2}{1+\cfrac{3^2}{1+\cfrac{3^2}{1+\ldots}}}}}}} \approx 0.5683000031$$

Input interpretation

$$\frac{1}{28} \times \frac{-2.11577389184199562473856 \times 10^9}{-383.999999984800187} + 21 \times 5 - 0.5683000031$$

Result

$196883.9975413049336330742144740859638117172618939881276516460 2587\ldots$

196883.9975413…. ≈ 196884

196884/196883 is a fundamental number of the following j-invariant

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

(In mathematics, Felix Klein's j-invariant or j function, regarded as a function of a complex variable τ, is a modular function of weight zero for SL(2, Z) defined on the upper half plane of complex numbers. Several remarkable properties of j have to

do with its q expansion (Fourier series expansion), written as a Laurent series in terms of $q = e^{2\pi i\tau}$ (the square of the nome), which begins:

$$j(\tau) = q^{-1} + 744 + 196884q + 21493760q^2 + 864299970q^3 + 20245856256q^4 + \cdots$$

Note that j has a simple pole at the cusp, so its q-expansion has no terms below q^{-1}.

All the Fourier coefficients are integers, which results in several almost integers, notably Ramanujan's constant:

$$e^{\pi\sqrt{163}} \approx 640320^3 + 744.$$

The asymptotic formula for the coefficient of q^n is given by

$$\frac{e^{4\pi\sqrt{n}}}{\sqrt{2}\, n^{3/4}},$$

as can be proved by the Hardy–Littlewood circle method)

We have that:

For:

$$r_c = 10^4 b_0$$

$$k_w = 1$$

1.94973e+13 = x * 10^4

b_0 = 1.94973 × 10^9

From:

$$\mathfrak{s} = k_w \left| \sqrt{\frac{2}{27}} 5 \sqrt{\left[1 - \sqrt{\frac{b_0}{r}}\right] \frac{1}{r}} \right|. \qquad (37)$$

sqrt(2/27) [5 sqrt((((1-sqrt((((1.94973 × 10^9)/(1.94973e+13)))))))*1/(1.94973e+13)]

Input interpretation

$$\sqrt{\frac{2}{27}}\left(5\sqrt{1-\sqrt{\frac{1.94973\times 10^9}{1.94973\times 10^{13}}}}\times\frac{1}{1.94973\times 10^{13}}\right)$$

Result

$6.94458\ldots \times 10^{-14}$

6.94458…*10^{-14}

From which:

47/(((-ln(((sqrt(2/27) [5 sqrt((((1-sqrt((((1.94973 × 10^9)/(1.94973e+13))))))))*1/(1.94973e+13)]))))-(2)^(1/3)))

Input interpretation

$$\frac{47}{-\log\left(\sqrt{\frac{2}{27}}\left(5\sqrt{1-\sqrt{\frac{1.94973\times 10^9}{1.94973\times 10^{13}}}}\times\frac{1}{1.94973\times 10^{13}}\right)\right)-\sqrt[3]{2}}$$

$\log(x)$ is the natural logarithm

Result

1.618551595469924533620678710689608132980492415888793151165615091 3…

1.618551595….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Possible closed forms

$\phi \approx 1.61803398$

$\frac{11}{C_P{}^5} \approx 1.61855158287 7$

$$\frac{1}{9}\sqrt{\frac{43}{2}}\ \pi \approx 1.61855176320$$

$$e - \frac{53\,\mathcal{H}_{\text{hep}}}{96} \approx 1.61855159491\,66$$

$$\frac{58\,397\,\pi}{113\,348} \approx 1.61855159501432$$

$$\frac{27}{29\,\mathcal{T}_3} - \frac{9}{29} \approx 1.61855159575101$$

$$\boxed{\text{root of } 3\,x^3 - 7\,x^2 + 195\,x - 310 \text{ near } x = 1.61855} \approx 1.61855159501809$$

$$-e^{-3+2/e-2\,e+7/\pi+\pi}\,\pi^{5-e}\tan(e\,\pi) \approx 1.61855159475\,92$$

$$\boxed{\text{root of } x^4 + 37\,x^3 - 23\,x^2 - 59\,x - 8 \text{ near } x = 1.61855} \approx 1.61855159496\,65$$

$$\frac{-5 + 8\,e + 7\,e^2}{4\left(2 - 5\,e + 3\,e^2\right)} \approx 1.61855159331\,69$$

$$\log\left(\frac{1}{6}\left(14 + 3\sqrt{2} + e - 9\,e^2 - \pi + 8\,\pi^2\right)\right) \approx 1.61855159571631$$

$$\frac{1}{5}\left(-6 e^{\pi} + 16\pi + 38\log(\pi) + 20\log(2\pi) + 13\tan^{-1}(\pi)\right) \approx 1.618551595\,01020$$

$$\pi \boxed{\text{root of } 172x^3 - 203x^2 - 42x + 52 \text{ near } x = 0.515201} \approx 1.618551594\,8118$$

$$\sqrt[3]{\frac{1}{30}(-11 + 34e + 17\pi - 11\log(2))} \approx 1.61855159\,49174$$

$$\frac{1}{\boxed{\text{root of } 8x^4 + 59x^3 + 23x^2 - 37x - 1 \text{ near } x = 0.617836}} \approx 1.61855159\,49665$$

$$\pi \boxed{\text{root of } 14x^4 - 38x^3 + 25x^2 - 28x + 12 \text{ near } x = 0.515201} \approx 1.61855159\,42764$$

C_P is Porter's constant

$\mathcal{H}_{\text{hep}}$ is the heptanacci constant

$\mathcal{T}_3$ is Trott's third constant

$\log(x)$ is the natural logarithm

$\tan^{-1}(x)$ is the inverse tangent function

Now, we have that:

$$P = \sqrt{\frac{6M^2r^2 - 12MrQ^2 + 6Q^4}{6M^2r^2 - 12MrQ^2 + 7Q^4}}.$$

((6(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/(6(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+7(1.12496e+15)^4))^0.5

Input interpretation

$$\sqrt{\left(\left(6\left(13.12806\times 10^{39}\right)^2\left(1.94973\times 10^{13}\right)^2 - 12\times 13.12806\times 10^{39}\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 6\left(1.12496\times 10^{15}\right)^4\right)/\left(6\left(13.12806\times 10^{39}\right)^2\left(1.94973\times 10^{13}\right)^2 - 12\times 13.12806\times 10^{39}\times 1.94973\times 10^{13}\left(1.12496\times 10^{15}\right)^2 + 7\left(1.12496\times 10^{15}\right)^4\right)\right)}$$

Result

0.999999999999999999999999999999999999999999999999979628780786527654...

From:

$$P^2 = \frac{C^{\alpha\beta\gamma\delta}C_{\alpha\beta\gamma\delta}}{R^{\alpha\beta\gamma\delta}R_{\alpha\beta\gamma\delta}} = \frac{6M^2r^2 - 12MrQ^2 + 6Q^4}{6M^2r^2 - 12MrQ^2 + 7Q^4},$$

((6(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/(6(13.12806e+39)^2(1.94973e+13)^2-12(13.12806e+39)(1.94973e+13)(1.12496e+15)^2+7(1.12496e+15)^4))

Input interpretation

$$(6(13.12806\times 10^{39})^2 (1.94973\times 10^{13})^2 - 12\times 13.12806\times 10^{39}\times 1.94973\times 10^{13} (1.12496\times 10^{15})^2 + 6(1.12496\times 10^{15})^4)/(6(13.12806\times 10^{39})^2 (1.94973\times 10^{13})^2 - 12\times 13.12806\times 10^{39}\times 1.94973\times 10^{13} (1.12496\times 10^{15})^2 + 7(1.12496\times 10^{15})^4)$$

Result

0.99999999999999999999999999999999999999999999925925757561573055309
...

We have also:

(ln(ln(((6(13.128e+39)^2(1.9497e+13)^2-12(13.128e+39)(1.9497e+13)(1.12496e+15)^2+6(1.12496e+15)^4)/(6(13.128e+39)^2(1.9497e+13)^2-12(13.128e+39)(1.9497e+13)(1.12496e+15)^2+7(1.12496e+15)^4))))-e)

Input interpretation

$$\log(\log((6(13.128\times 10^{39})^2 (1.9497\times 10^{13})^2 - 12\times 13.128\times 10^{39}\times 1.9497\times 10^{13} (1.12496\times 10^{15})^2 + 6(1.12496\times 10^{15})^4)/(6(13.128\times 10^{39})^2 (1.9497\times 10^{13})^2 - 12\times 13.128\times 10^{39}\times 1.9497\times 10^{13} (1.12496\times 10^{15})^2 + 7(1.12496\times 10^{15})^4))) - e$$

$\log(x)$ is the natural logarithm

Result

-34.0798

-34.0798

From which:

-55*1/(2 - 64/π - 5 π)

where

$$2 - \frac{64}{\pi} - 5\pi \approx -34.07979598$$

Input

$$-55\times\frac{1}{2-\frac{64}{\pi}-5\pi}$$

Result

$$-\frac{55}{2-\frac{64}{\pi}-5\pi}$$

Decimal approximation

1.6138594264556993720264190372822706109281257129538800726166194170

…

1.6138594264…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Property

$-\frac{55}{2-\frac{64}{\pi}-5\pi}$ is a transcendental number

Alternate forms

$$\frac{55\pi}{64-2\pi+5\pi^2}$$

$$\frac{55\pi}{64+\pi(5\pi-2)}$$

Alternative representations

$$-\frac{55}{2-\frac{64}{\pi}-5\pi}=-\frac{55}{2-900°-\frac{64}{180°}}$$

$$-\frac{55}{2-\frac{64}{\pi}-5\pi} = -\frac{55}{2-5\cos^{-1}(-1)-\frac{64}{\cos^{-1}(-1)}}$$

$$-\frac{55}{2-\frac{64}{\pi}-5\pi} = -\frac{55}{2+5\,i\log(-1)--\frac{64}{i\log(-1)}}$$

Series representations

$$-\frac{55}{2-\frac{64}{\pi}-5\pi} = \frac{55\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}{2\left(8-\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+10\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2\right)}$$

$$-\frac{55}{2-\frac{64}{\pi}-5\pi} = \frac{55\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}{64-2\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)+5\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^2}$$

$$-\frac{55}{2-\frac{64}{\pi}-5\pi} = \left(55\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)\Bigg/ \left(64-2\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}+5\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2\right)$$

And:

-56*1/(2 - 64/π - 5 π)

Input

$$-56\times\frac{1}{2-\frac{64}{\pi}-5\pi}$$

Result

$$-\frac{56}{2-\frac{64}{\pi}-5\pi}$$

Decimal approximation

1.6432023251185302696996266561419482583995461804621324375732852246
...

$1.64320232\ldots. \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Property

$-\frac{56}{2-\frac{64}{\pi}-5\pi}$ is a transcendental number

Alternate forms

$$\frac{56\pi}{64-2\pi+5\pi^2}$$

$$\frac{56\pi}{64+\pi(5\pi-2)}$$

Alternative representations

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = -\frac{56}{2-900\,°-\frac{64}{180\,°}}$$

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = -\frac{56}{2-5\cos^{-1}(-1)-\frac{64}{\cos^{-1}(-1)}}$$

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = -\frac{56}{2+5\,i\log(-1)--\frac{64}{i\log(-1)}}$$

Series representations

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = \frac{28\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}}{8-\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}+10\left(\sum_{k=0}^{\infty}\frac{(-1)^k}{1+2k}\right)^2}$$

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = \frac{56\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)}{64-2\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)+5\left(\sum_{k=0}^{\infty}\left(-\frac{1}{4}\right)^k\left(\frac{1}{1+2k}+\frac{2}{1+4k}+\frac{1}{3+4k}\right)\right)^2}$$

$$-\frac{56}{2-\frac{64}{\pi}-5\pi} = \left(56\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)\Bigg/ \left(64-2\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}+5\left(\sum_{k=0}^{\infty}-\frac{4(-1)^k\,1195^{-1-2k}\left(5^{1+2k}-4\times 239^{1+2k}\right)}{1+2k}\right)^2\right)$$

We have also:

√(29/5)((-ln((6(13.128e+39)^2(1.9497e+13)^2-12(13.128e+39)(1.9497e+13)(1.1249e+15)^2+6(1.1249e+15)^4)/(6(13.128e+39)^2(1.9497e+13)^2-12(13.128e+39)(1.9497e+13)(1.1249e+15)^2+7(1.1249e+15)^4))))^1/3.5

Input interpretation

$$\sqrt{\frac{29}{5}}\left(-\log\left(\left(6\left(13.128\times10^{39}\right)^2\left(1.9497\times10^{13}\right)^2-12\times13.128\times10^{39}\times1.9497\times10^{13}\left(1.1249\times10^{15}\right)^2+6\left(1.1249\times10^{15}\right)^4\right)/\left(6\left(13.128\times10^{39}\right)^2\left(1.9497\times10^{13}\right)^2-12\times13.128\times10^{39}\times1.9497\times10^{13}\left(1.1249\times10^{15}\right)^2+7\left(1.1249\times10^{15}\right)^4\right)\right)\right)\wedge(1/3.5)$$

$\log(x)$ is the natural logarithm

Result

$6.94554\ldots\times10^{-14}$

$6.94554\ldots*10^{-14}$ result very near to the previous solution of the following expression:

$$\sqrt{\frac{2}{27}}\left(5\sqrt{1-\sqrt{\frac{1.94973\times10^{9}}{1.94973\times10^{13}}}\times\frac{1}{1.94973\times10^{13}}}\right)$$

$= 6.94458\ldots*10^{-14}$

From which:

-48/(ln(6.94554 × 10^-14)+1)

Input interpretation

$$-\frac{48}{\log(6.94554\times10^{-14})+1}$$

$\log(x)$ is the natural logarithm

Result

1.6383319670225484534206935296227307470716852503146049337417458405...

1.638331967…. result very near to the mean between $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ..., the value of golden ratio 1.61803398… and the 14th root of the Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578..., i.e. 1.63958266

Mathematical connections with some sectors of String Theory

From:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\, \frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{\,-\,2\,C} \;=\; \frac{h^2 \left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;=\; k\, e^{\,-\,2\,A} \;+\; \frac{h^2}{16(p\,+\,1)} \left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{\,-\,2\,(8\,-\,p)\,C\,+\,2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and $\beta_E = 1/2$:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 642, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18))   we obtain:

Input:

$$\exp\left(-\pi \sqrt{18}\right)$$

Exact result:

$$e^{-3\sqrt{2}\,\pi}$$

Decimal approximation:

$$1.627201622607250929294215673911797954183858113695401\ldots \times 10^{-6}$$

1.6272016… * 10^{-6}

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

from which:

$\frac{1}{4096} e^{-6C+\phi}$ = 1.6272016… * 10^-6

0.000244140625 $e^{-6C+\phi}$ = $e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

0.000244140625 $e^{-6C+\phi}$ = $e^{-\pi\sqrt{18}}$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625} e^{-6C+\phi} = \frac{1}{0.000244140625} e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right) \times \frac{1}{0.000244140625}$$

Result:

0.00666501785...

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096 \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j} 17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$e^{-6C+\phi}$ = 0.0066650177536

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

= 0.00666501785…

From:

ln(0.00666501784619)

Input interpretation:

log(0.00666501784619)

Result:

–5.010882647757…

-5.010882647757…

Alternative representations:

$$\log(0.006665017846190000) = \log_e(0.006665017846190000)$$

$$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$$

$$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$$

Series representations:

$$\log(0.006665017846190000) = -\sum_{k=1}^{\infty}\frac{(-1)^k(-0.993334982153810000)^k}{k}$$

$$\log(0.00666501784619000) = 2 i \pi \left\lfloor \frac{\arg(0.00666501784619000 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.00666501784619000) = \left\lfloor \frac{\arg(0.00666501784619000 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.00666501784619000 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.00666501784619000) = \int_1^{0.00666501784619000} \frac{1}{t} \, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}} - \varphi + 1} = 1 - \cfrac{e^{-\pi}}{1 + \cfrac{e^{-2\pi}}{1 + \cfrac{e^{-3\pi}}{1 + \cfrac{e^{-4\pi}}{1 + \ldots}}}} \approx 0.9568666373$$

$$\frac{\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\sqrt{5}}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}-\varphi+1} = 1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	-0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1} = 1 - \frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}} \approx 0.9991104684$$

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$\begin{aligned} e^{2C} &= \frac{2\,\xi\, e^{\frac{\phi}{2}}}{1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}} \\ \frac{h^2}{32} &= \frac{\xi^7\, e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right) + 5\, T\, e^{2\phi}\right] . \end{aligned} \tag{2.7}$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\, e^{0.989117352243/2}}{1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}}$$

Result:

0.83941881822… −
1.4311851867… i

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}}\, \sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k \left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k} \binom{\frac{1}{2}}{k}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}}\, \sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k \left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{z_0}\, \sum_{k=0}^{\infty}\frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\, e^{1.97823470448600000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

From

$$\frac{h^2}{32} = \frac{\xi^7 e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3} e^{2\phi}}\right) + 5\, T\, e^{2\phi}\right]$$

we obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)$$

Result:

50.84107889… − 20.34506335… i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.98911735224300000}}{\pi^2}\right)e^{4\times 0.98911735224300000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)^7=$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0\in\mathbb{R}$ and $-\infty<z_0\le 0$))

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850… −
0.5983842161… i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Bigg/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Bigg/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right) e^{4\times 0.9891173522430000}\right)\Bigg/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right) =$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/$$

$$\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

Now, we have:

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1+\sqrt{1+\frac{\xi\Lambda}{3}\,e^{2\phi}}}, \tag{2.9}$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right]. \tag{2.10}$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\,e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}} = 2\Bigg/\left(e^{0.4945586761215000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}} = 2\Bigg/\left(e^{0.4945586761215000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\,e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}} = \frac{2}{e^{0.49455867612150000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. □

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.494558676121500000}}{8}+\frac{1}{8}e^{0.494558676121500000}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}$$
$$\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.98911735224300000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.494558676121500000}}{8}+\frac{1}{8}e^{0.494558676121500000}\sqrt{\frac{4e^{1.978234704486000}\pi^2}{75}}$$
$$\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.98911735224300000}}{3\times25}}}}=1+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

$$\text{for }(\text{not }(z_0\in\mathbb{R}\text{ and }-\infty<z_0\le 0))$$

And from

$$\frac{h^2}{32}=\frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}}\right)-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}\right)$$

Result:

$-0.034547055658\ldots$

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Bigg/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.\left. e^{-4\times 0.9891173522430000}\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\right.\right.\right.$$
$$\left.\left.\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Bigg/\left(25\right.$$
$$e^{5.934704113458000}$$
$$\left.\left.\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

From which:

47 *1/(((-1/((((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1/1/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47/1/\left(e^{-4\times 0.98911735224300000}\left(42\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}-\frac{1}{25}\left(4\pi^2\right)13\,e^{2\times 0.98911735224300000}\right)\right)\right)\right)/\left(1+\sqrt{1+\frac{\left(4\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}\right)^7\right)=$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)/\left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And again:

32((((e^(-4*0.989117352243) /
[1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 *
[42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-
13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

-1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32 e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right.\right.\right. -$$

$$\left.\left.\left.\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/$$

$$\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$

$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$

$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$

$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right. - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\,\pi^2 - 25\, e^{1.978234704486000}\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right. - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\,\pi^2 - 25\, e^{1.978234704486000}\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{z_0} \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75} - z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}$$

Result:

-0

$1.0514303501\ldots i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{\left(4\,\pi^2\right) e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\left(4\,\pi^2\right) 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{\left(4\,\pi^2\right) e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=$$

$$-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\left(1\Bigg/\left(\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}\right)\right)$$

Result:

0.95108534763... i

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s, to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}-\varphi+1}} = 1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}} \approx 0.9568666373$$

Series representations:

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right) =$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)\right)}\right)\right)$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}\,(4\,\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\,\sqrt{21}\,\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\,\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From the previous expression

$$\frac{\dfrac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}}{\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)}$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.98911735224300000}}{3\times 25}}}}-0.0345470556580000=$$
$$0.9654529443420000+\frac{e^{0.49455867612150000}}{8}+\frac{1}{8}\,e^{0.49455867612150000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.9891173522430000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.9891173522430000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

Observations

We note that, from the number 8, we obtain as follows:

8^2

64

$8^2 \times 2 \times 8$

1024

$8^4 = 8^2 \times 2^6$

True

$8^4 = 4096$

$8^2 \times 2^6 = 4096$

$2^{13} = 2 \times 8^4$

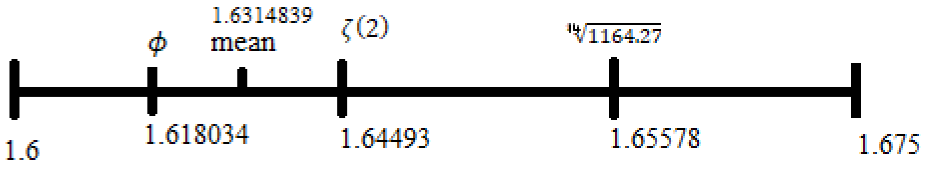
True

$2^{13} = 8192$

$2 \times 8^4 = 8192$

We notice how from the numbers 8 and 2 we get 64, 1024, 4096 and 8192, and that 8 is the fundamental number. In fact 8^2 = 64, 8^3 = 512, 8^4 = 4096. We define it "fundamental number", since 8 is a Fibonacci number, which by rule, divided by the previous one, which is 5, gives 1.6 , a value that tends to the golden ratio, as for all numbers in the Fibonacci sequence

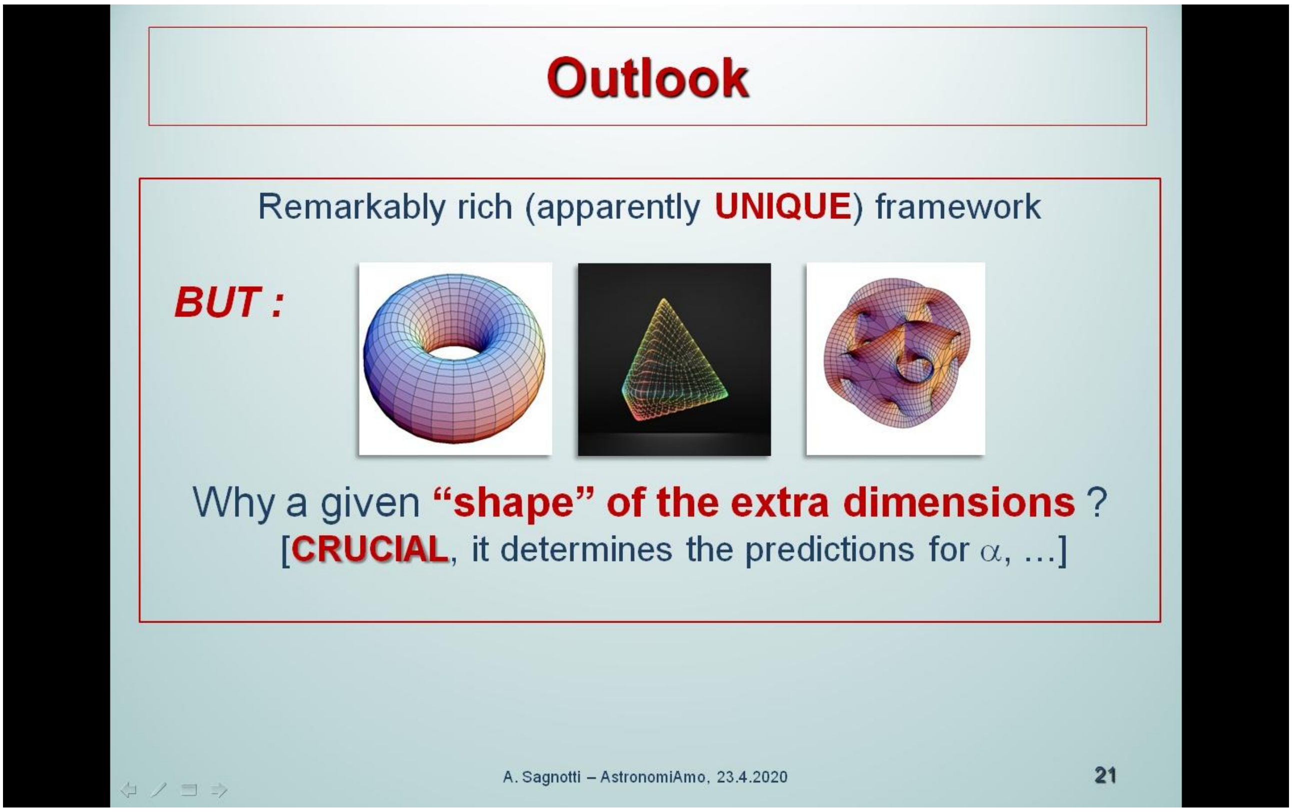
“Golden” Range



Finally we note how $8^2 = 64$, multiplied by 27, to which we add 1, is equal to 1729, the so-called "Hardy-Ramanujan number". Then taking the 15th root of 1729, we obtain a value close to $\zeta(2)$ that 1.6438 ..., which, in turn, is included in the range of what we call "golden numbers"

Furthermore for all the results very near to 1728 or 1729, adding $64 = 8^2$, one obtain values about equal to 1792 or 1793. These are values almost equal to the Planck multipole spectrum frequency 1792.35 and to the hypothetical Gluino mass

Appendix



From: *A. Sagnotti – AstronomiAmo, 23.04.2020*

In the above figure, it is said that: "why a given shape of the extra dimensions? Crucial, it determines the predictions for α".

We propose that whatever shape the compactified dimensions are, their geometry must be based on the values of the golden ratio and ζ(2), (the latter connected to 1728 or 1729, whose fifteenth root provides an excellent approximation to the above mentioned value) which are recurrent as solutions of the equations that we are going to develop. It is important to specify that the initial conditions are **always** values belonging to a fundamental chapter of the work of S. Ramanujan "Modular equations and Appoximations to Pi" (see references). These values are some multiples of 8 (64 and 4096), 276, which added to 4096, is equal to 4372, and finally $e^{\pi\sqrt{22}}$

We have, in certain cases, the following connections:

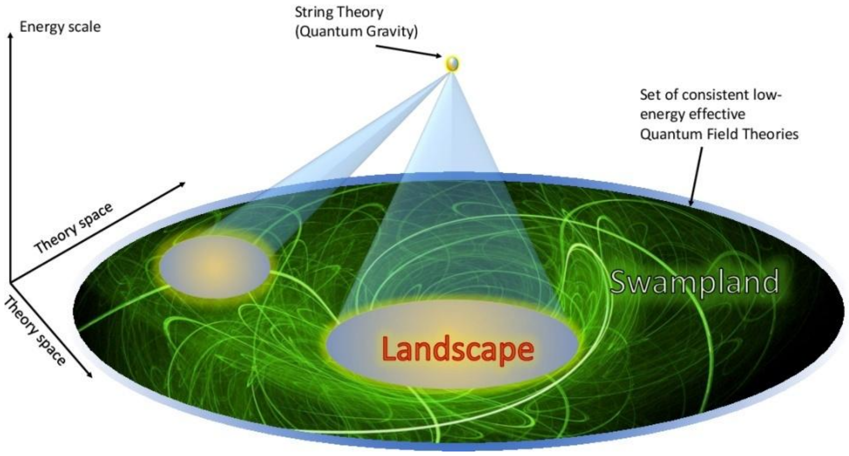


Fig. 1

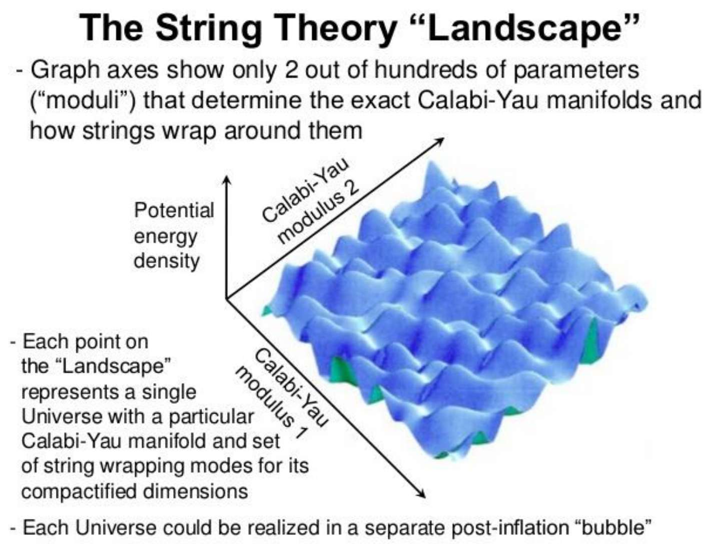


Fig. 2

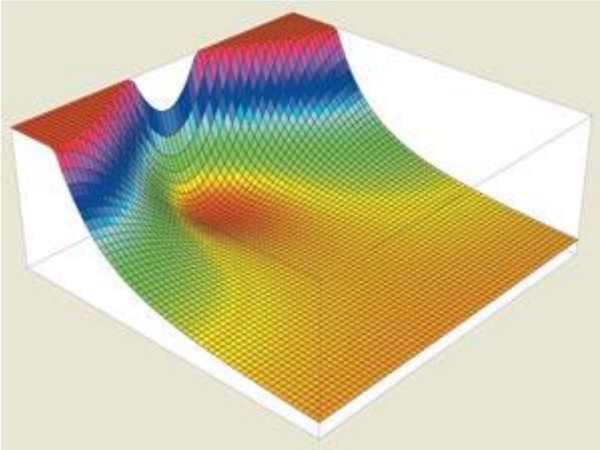


Fig. 3

Stringscape - a small part of the string-theory landscape showing the new de Sitter solution as a local minimum of the energy (vertical axis). The global minimum occurs at the infinite size of the extra dimensions on the extreme right of the figure.

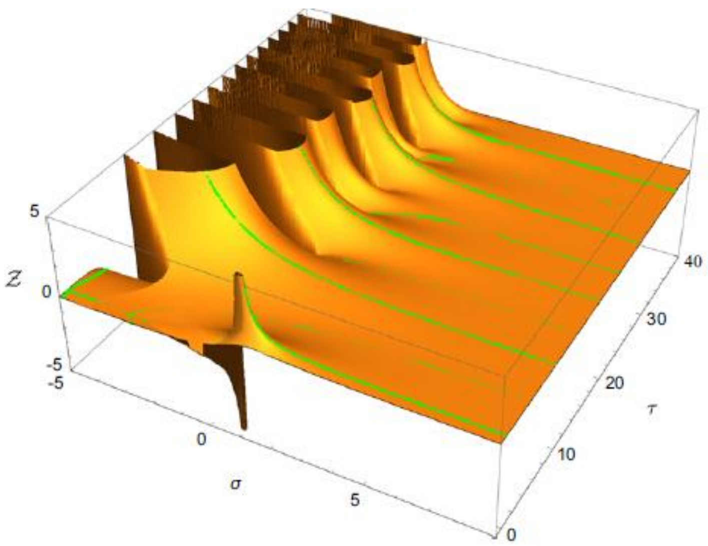


Figure 2. Lines in the complex plane where the Riemann zeta function ζ is real (green) depicted on a relief representing the positive absolute value of ζ for arguments $s \equiv \sigma + \mathrm{i}\tau$ where the real part of ζ is positive, and the negative absolute value of ζ where the real part of ζ is negative. This representation brings out most clearly that the lines of constant phase corresponding to phases of integer multiples of 2π run down the hills on the left-hand side, turn around on the right and terminate in the non-trivial zeros. This pattern repeats itself infinitely many times. The points of arrival and departure on the right-hand side of the picture are equally spaced and given by equation (11).

Fig. 4

With regard the Fig. 4 the points of arrival and departure on the right-hand side of the picture are equally spaced and given by the following equation:

$$\tau'_k \equiv k \frac{\pi}{\ln 2},$$

with $k = \ldots, -2, -1, 0, 1, 2, \ldots.$

we obtain:

2Pi/(ln(2))

Input:

$$2 \times \frac{\pi}{\log(2)}$$

Exact result:

$$\frac{2\pi}{\log(2)}$$

Decimal approximation:

9.064720283654387619255365891433333620343722935447591168372033095 8
...

9.06472028365….

Alternative representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log_e(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(a)\log_a(2)}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2\coth^{-1}(3)}$$

Series representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2 i \pi \left\lfloor \frac{\arg(2-x)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-x)^k x^{-k}}{k}} \quad \text{for } x < 0$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\log(z_0) + \left\lfloor \frac{\arg(2-z_0)}{2\pi} \right\rfloor \left(\log\left(\frac{1}{z_0}\right) + \log(z_0)\right) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{2 i \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (2-z_0)^k z_0^{-k}}{k}}$$

Integral representations:

$$\frac{2\pi}{\log(2)} = \frac{2\pi}{\int_1^2 \frac{1}{t}\, dt}$$

$$\frac{2\pi}{\log(2)} = \frac{4 i \pi^2}{\int_{-i\infty+\gamma}^{i\infty+\gamma} \frac{\Gamma(-s)^2 \Gamma(1+s)}{\Gamma(1-s)}\, ds} \quad \text{for } -1 < \gamma < 0$$

From which:

(2Pi/(ln(2)))*(1/12 π log(2))

Input:

$$\left(2\times\frac{\pi}{\log(2)}\right)\left(\frac{1}{12}\,\pi\log(2)\right)$$

$\log(x)$ is the natural logarithm

Exact result:

$$\frac{\pi^2}{6}$$

Decimal approximation:

1.644934066848226436472415166646025189218949901206798437735558229 3

...

1.6449340668…. = ζ(2) = $\frac{\pi^2}{6}$ = 1.644934 ...

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